

Queen Charlotte Sound Groundfish Bottom Trawl Survey, July 7th to August 8th, 2009

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Fisheries and Oceans Canada
Science Branch, Pacific Region
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Nanaimo, BC
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JULY 7TH TO AUGUST 8TH, 2009

by

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ABSTRACT

Olsen, N., Rutherford, K.L., Stanley, R.D., and Wyeth, M.R. 2009. Queen Charlotte Sound groundfish bottom trawl survey, July 7th to August 8th, 2009. Can. Manuscr. Rep. Fish. Aquat. Sci. 2899: vi + 61 p.

A bottom trawl survey of Queen Charlotte Sound and southern Hecate Strait was conducted on the fishing vessel F/V Viking Storm between July 7th and August 8th, 2009. The survey was jointly conducted and funded by the Canadian Groundfish Research and Conservation Society (CGRCS) and Fisheries and Oceans Canada (DFO), and was the fifth in a series of surveys that began in 2003. The first three surveys were conducted annually between 2003 and 2005, after which the survey schedule was changed to every second year, starting in 2007. The Queen Charlotte Sound survey is one of a long-term and coordinated set of surveys that cover the continental and upper slope of the continental shelf of most of the British Columbia coast. The objective of these surveys is to provide fishery independent abundance indices of all demersal fish species available to bottom trawling, as well as to collect biological samples of selected species.

The survey conducted 233 successful tows from a total of 250. The mean catch per usable tow was 325 kg, averaging 17 different species of fish and invertebrates each. The most abundant fish species encountered was Pacific ocean perch followed by arrowtooth flounder, silvergray rockfish, and yellowmouth rockfish. Biological data, including individual length, weight, sex, maturity, and age were collected from 62 different species of fish. Oceanographic data and net geometry were also recorded for most tows, including water temperature, depth, headrope height, doorspread.

RÉSUMÉ

Olsen, N., Rutherford, K.L., Stanley, R.D., and Wyeth, M.R. 2009. Queen Charlotte Sound groundfish bottom trawl survey, July 7th to August 8th, 2009. Can. Manuscr. Rep. Fish. Aquat. Sci. 2899: vi + 61 p.

La Canadian Groundfish Research and Conservation Society (CGRCS) et Pêches et Océans Canada (MPO) ont financé et procédé conjointement à la réalisation d'un relevé au chalut de fond dans le bassin Reine-Charlotte et le sud du détroit d'Hécate du 3 juillet au 3 août 2007. Mené par le navire de pêche F/V *Viking Storm*, ce relevé est le premier d'une série prévue de relevés coordonnés à long terme du plateau continental et de la partie supérieure du talus de la majeure partie de la côte de la Colombie-Britannique. L'objectif de ces relevés est l'établissement d'indices d'abondance, indépendants de la pêche, de toutes les espèces de poissons démersaux capturables au chalut de fond et la collecte de données biologiques sur certaines espèces.

Des 277 traits de chalut, 257 ont été fructueux. Les prises moyennes par trait se chiffraient à 269 kg. Quelque 18 espèces différentes de poissons et d'invertébrés ont été prises en moyenne à chaque trait. Le sébaste à longue mâchoire était l'espèce la plus abondante; venaient ensuite la plie à grande bouche, le sébaste argenté et le sébaste à raie rouge. Des données biologiques (longueur, poids, sexe, stade de maturité et âge) ont été recueillies pour 62 espèces de poisson. Des données océanographiques (température de l'eau et profondeur) et des données sur la géométrie du chalut (hauteur de la ralingue supérieure, écartement des panneaux et vitesse du courant à travers le chalut) ont également été collectées pour la plupart des traits.

INTRODUCTION

In 2003 a report by the Pacific Scientific Advice Review Committee (PSARC) recommended development of fishery independent relative abundance indices using bottom trawl surveys in British Columbia waters (Sinclair et al., 2003). As an initial step, it recommended that a pilot survey be conducted in PMFC major areas 5A and 5B (Queen Charlotte Sound, Figure 1). This region was recommended in part because it is not covered by other bottom trawl surveys and it represents a significant portion of the commercial bottom trawl fishery.

In February 2003, the Canadian Groundfish Research and Conservation Society (CGRCS) committed to funding the principal portion of the required vessel and net costs, and a significant portion of the scientific staff needed to conduct the survey and analyze the results. The Science Branch of Fisheries and Oceans, Canada (DFO) committed to funding additional scientific and sampling staff, and to provide the scientific sampling equipment.

The first three groundfish bottom trawl surveys of Queen Charlotte Sound were conducted annually from 2003 to 2005 in July and August (Olsen et al., 2007a, 2007b, and 2007c). After 2005, the survey was re-scheduled to occur every second year, beginning in 2007 (Olsen et al., 2007d). This document provides a brief synopsis of the fifth survey, which took place from July 7th to August 8th, 2009, and includes the methods used and data collected. It is not intended as a comprehensive review of the survey, nor does it provide interpretive analysis of the survey results. These topics will be covered in more detailed companion documents.

METHODS

VESSEL AND FISHING GEAR

The survey was conducted aboard the commercial stern trawler F/V Viking Storm (Figure 2). The trawl net used was an Atlantic Western IIA box trawl (

Table 1) connected to 1,000 kg Thyboron 104 doors with 11 m door legs.

STAFF SUMMARY

A total of 18 personnel were involved in the survey, which was split into 4 sections or "legs", each of 9 days in duration with 10 staff in each. The Canadian Groundfish Conservation and Research Society (CGCRS) funded employees of Leader Fishing Ltd. and Archipelago Marine Research Ltd. (AMR). All other staff were funded by Fisheries and Oceans Canada (DFO) (Table 2).

SURVEY DESIGN

The study area consists of all of Queen Charlotte Sound and the southern part of Hecate Strait, excluding near-shore waters and inlets, areas closed to fishing, and protected sponge reef areas (Figure 3). The southern portion of Hecate Strait was included in order to provide coverage contiguous with the Hecate Strait groundfish bottom trawl survey. We split the study area into two spatial strata, creating northern and southern regions that split along Mitchell and Reed Troughs. In addition to these areal strata we divided the study area into four depth strata, creating a total of eight strata (Table 3).

We divided the survey area into a contiguous grid of 4 km² blocks and from these blocks we randomly selected 300 primary fishing locations (Figure 4) based on a target allocation of 240. We arrived at the figure of 300 by calculating an expected per-stratum failure rate based on our previous survey results, and applying these factors to our 2009 allocation scheme to compensate for the predicted rate of failure.

OPERATIONS

Fishing

Fishing commenced approximately 30 minutes after sunrise and ended at 30 minutes before sunset each day, where start and end fishing is defined as the trawl net on, and off bottom, respectively. This yielded an average working day length of 15 hours, starting at approximately six o'clock in the morning and ending at about nine o'clock in the evening.

Prior to fishing, the captain and chief scientist reviewed the selected fishing locations to determine a candidate set of locations to visit throughout the day. During this review process the captain would sometimes determine, based on his experience and knowledge of an area, that one or more locations were not fishable. In such cases we would mark the locations as "rejected based on prior knowledge". After compiling a list

of candidate locations to be visited, the captain would then plan the most efficient route of travel between locations.

We frequently began fishing immediately on arrival at a fishing location. However, if the captain was not familiar with an area we would “sound” the region (traverse the location and examine the depth sounder trace) to determine if it was suitable for trawling. If it was not, we marked the location and “rejected based on inspection”.

When trawling, the captain would attempt to tow through the center of the 4 km² fishing block, usually following a depth contour. However, where the bottom topography made this difficult or impossible, the captain would trawl wherever he felt he could obtain a successful result, with the stipulation that at least half of the total trawl track had to be within the 4 km² block (Figure 5). The scope used in 2009 is shown in

Table 4 and Figure 6.

To determine the start of each 20 minute tow, we monitored the real-time net sensor data to establish when the net reached the sea floor and the headrope collapsed to a height of about three to four meters, at which point we considered the net to be actively fishing. Nineteen minutes after the start of the tow, we retrieved the net. Retrieval was done one minute early because slack in the warps creates a lag of about one minute before the net leaves the bottom. Although our target on-bottom time was 20 minutes, we accepted tows that were at least 15 minutes in length. This was a pragmatic decision that allowed us to retain many tows that would otherwise have been failures due to hang-ups or early haul-backs.

The result of trawling was either a successful tow, or a hang-up or tear-up of the trawl net. In the event of a hang-up or tear-up, we would either mark the location as “rejected after one or more attempts to fish” or make additional attempts to fish. Thus, we kept records of the three scenarios that resulted in a location being removed from the sampling frame:

- Rejection based on prior knowledge
- Rejection based on on-ground inspection
- Rejection based on one or more failed fishing attempts

Rejected locations were removed from the sampling frame for the current and all future surveys. Thus, every year of the survey results in the removal of some unfishable area, which over time, will lead to increasing efficiency (i.e. we will spend less time surveying areas that cannot be fished).

Gear and Oceanographic Sensors

The trawl net was equipped with a variety of real-time sensors including temperature, depth, doorspread, current velocity, and headrope height. These sensors transmitted data to a bridge computer once per second and allowed us to continually monitor the net during fishing. In addition to these real-time sensors, we also attached data-logging probes to collect water temperature and pressure/depth (Seabird 39), dissolved oxygen, pH, salinity, temperature, and depth (Seabird 19plus), and contact of

the trawl net with the sea floor (NMFS Bottom Contact Sensor). Data from these logging probes were downloaded at the end of each day.

Catch Processing

Codend contents were dumped into a raised rectangular sorting bin approximately three meters long by two meters wide. Any catch that did not fit into the sorting bin was dumped into a spillway aft of the bin. We completely sorted and weighed the catch to species, except in rare instances when the catch was too large to be sorted in a reasonable amount of time. In these cases we weighed 10 baskets each of the dominant species and then simply counted additional baskets of those species. Later, the mean weight of the 10 baskets was applied to the counted baskets to arrive at a total weight. For all other species we weighed all baskets.

Biological Sampling

While the primary purpose of this survey was to generate fishery independent indices of relative abundance, our second goal was to collect associated biological information on the size, sex, and age composition of selected species. In particular, our biological sampling priorities were to collect length and sex frequencies on all species in the catch of each tow (subject to a minimum number of specimens criteria), to collect representative samples of specimen length and weight, and to collect age samples for select species.

We selected age samples from the dominant (by weight) catch in each tow, as well as certain species deemed high priority due to concerns over stock status (for example, Bocaccio, lingcod, and Pacific cod). Otoliths (calcareous accretions of the inner ear) were collected from rockfish and flatfish species while fin clips were taken from lingcod and Pacific cod. Both of these structures grow in a series of annular rings that can be counted to determine age.

RESULTS

FISHING

We divided the survey into four sections of nine days each. This duration was short enough that we were able to retain a significant amount of the catch, which was sold at the end of each leg, and also allowed us to rotate the science crews. The overall pattern of each leg covered a longitudinal segment of Queen Charlotte Sound, starting in the east and moving progressively west with each leg (Figure 7). We imposed this pattern in order to minimize yearly bias resulting from changes in area/times fished (for example, fishing the western side of the sound first in one year vs. the eastern side the next). Our choice of an east to west direction was to avoid unintentionally tracking a fish stock, as some species are known to migrate from deeper to shallower water from July to August.

From a total of 33 survey days, three days in total were required for travel at the start and end of the survey, four days were required for offloading catch and changing crews, and about a half day was lost due to equipment repairs. Thus, we ended with a total of about 25 full fishing days, in which time we conducted 250 tows, of which 233

were successful and 17 were unsuccessful due to hang-ups or tear-ups, for an average of about nine successful tows per fishing day (Table 5).

The final status of the 2007 sampling frame includes 233 successfully fished locations, 2 locations rejected prior to fishing, based on the captain's knowledge, 52 locations rejected based on on-ground inspection, and 12 locations rejected after one or more failed fishing attempts (Figure 8). One location was fished unsuccessfully but left in the sampling frame for future surveys because we felt that it was probably fishable but due to time constraints, we were unable to make a second attempt.

CATCH

Catch weight per tow was typically less than 1,000 kg and on average, we observed about 10 to 25 species per tow (Figure 9 and Figure 10). We caught a total of 112,969 kg of fish and invertebrates. Most of this (112,103 kg) consisted of 90 different taxonomic groups of fish, including 28 rockfish taxa and 13 flatfish taxa. The remainder (866 kg) consisted of 90 invertebrate groups (Table 6). Of the fish species, Pacific ocean perch was the most dominant by weight, followed by arrowtooth flounder, silvergray rockfish, and yellowmouth rockfish (Table 7). Biomass indices over the history of the survey (2003 to 2009) are shown in Figure 11. Significant amounts of the commercially viable fish catch, especially Pacific ocean perch, were offloaded with the proceeds going to the Canadian Groundfish Conservation and Research Society (Table 8).

SAMPLES AND SPECIMENS

We sampled 62 species of fish for attributes such as length, weight, sex, maturity, and age (Table 9, Table 10, and Table 11).

GEAR AND OCEANOGRAPHIC SENSORS

We collected Seabird 39 data (water temperature and depth) from 247 tows and Seabird 19plus data (water temperature, depth, pH, salinity, and dissolved oxygen from 193 tows (Table 12, Figure 12). Although we have not yet analyzed these data in detail, they may prove useful for explaining, or at least correlate to, short term anomalies in abundance trends. In addition, they provide a base reference for detecting future climate change.

We collected bottom contact data from the NMFS Bottom Contact Sensor from 246 tows (Table 12). These data provide a record of the trawl net contact with the sea floor and thus are useful not only for determining the quality and quantity of the sea floor contact, but also indicate the relative rugosity of the sea floor. We use these data to determine the exact times that the trawl net first and last contacts the sea floor, thus providing an accurate measure of total bottom contact time (Figure 13).

Net sensor data from the Scanmar system was recorded from most tows. However the Scanmar temperature/depth sensor was not functioning properly and we recorded data from this sensor from only 63 tows (Table 12, Figure 14). Fortunately, temperature and depth are provided by both the Seabird 29 and 19plus probes.

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Table 1. Net specifications.

Part	Standard Length	Material	Metric Length	Units	Material
Rigging					
Sweep Line	90	7/8 cable	27.4	m	22 mm cable
Upper bridle	90	3/4 cable	27.4	m	19 mm cable
Lower bridle	90	7/8 cable	27.4	m	22 mm cable
Door Legs	36	7/8 cable	11	m	22 mm cable
Pickups	42	7/8 cable	12.8	m	22 mm cable
Hook ups	8.8 t	BMMDV80	8 mt	mt	BMMDV80
Net frame					
Headline	74.5	5/8 cable	22.7	m	16 mm cable
Headline floats	90	8" plastic Spheres			200 mm plastic spheres
Riblines		1" Polysteel rope			25 mm polysteel rope
Bolsch Line	68.33	9/8" poly steel rope	20.8	m	29 mm polysteel rope
Fishing Line	107.33	14 mm long link chain	32.7	m	14 mm long link chain
Foot Rope					
Foot Rope	107.33	5/8 Chain	32.7	m	16 mm chain
Foot rope bosom	14	16 in Tire gear with 2 in Spacing	4.3	m	400 mm tire gear with 50 mm spacing
Root rope wing1	18.33	18" rock hopper, 18 " disks spaced 18 " apart	5.6	m	450 mm rock hopper 450 mm spacing
Root rope wing2	8.83	18" rock hopper, 18 " disks spaced 18 " apart	2.7	m	450 mm rock hopper 450 mm spacing
Web					
Belly	5"	3.5 mm Euroline	127	mm	3.5 mm Euroline
Square	5"	3.5 mm Euroline	127	mm	3.5 mm Euroline
Side Panel	5"	3.5 mm Euroline	127	mm	3.5 mm Euroline
Taper	4.5"	3.5 mm Euroline	114	mm	3.5 mm Euroline
Intermediate	4.5"	3.5 mm Euroline	114	mm	3.5 mm Euroline
Codend	4.5"	3.5 mm Euroline	114	mm	3.5 mm Euroline
Guard Mesh	4.5 or 5 "	Double 4.5 mm Euroline	114 or 127	mm	Double 4.5 mm Euroline
Liner	3/4"	Notless Nylon	19	mm	Notless Nylon

Table 2. Survey personnel for each leg of the survey.

Leg	Dates	Person	Role	Affiliation
1	July 7th to July 15th	Scott McLeod	Captain	Frosti Fishing Ltd.
		Norm Olsen	Chief Scientist	DFO
		Kate Rutherford	Lab Boss	DFO
		Brock Medlar	Science	AMR
		Matt McKay	Science	AMR
		Ken Barabash	Science	AMR
		Rory Johnson	Fishing Ops	Frosti Fishing Ltd.
		Flo Salm	Fishing Ops	Frosti Fishing Ltd.
		Scott Wallace	Engineer/Fishing Ops	Frosti Fishing Ltd.
2	July 15th to July 23rd	Derrick Prince	Cook	Frosti Fishing Ltd.
		Chris Roberts	Captain	Frosti Fishing Ltd.
		Karina Cooke	Chief Scientist	DFO
		Matt McKay	Lab Boss	AMR
		Brock Medlar	Science	DFO
		Bernie White	Science	DFO
		Dan Erskine	Science	AMR
		Rory Johnson	Fishing Ops	Frosti Fishing Ltd.
		Flo Salm	Fishing Ops	Frosti Fishing Ltd.
3	July 23rd to July 31st	Scott Wallace	Engineer/Fishing Ops	Frosti Fishing Ltd.
		Derrick Prince	Cook	Frosti Fishing Ltd.
		Chris Roberts	Captain	Frosti Fishing Ltd.
		Malcolm Wyeth	Chief Scientist	DFO
		Kristina Anderson	Lab Boss	DFO
		Brock Medlar	Science	DFO
		Matt McKay	Science	AMR
		Dan Erskine	Science	AMR
		Rory Johnson	Fishing Ops	Frosti Fishing Ltd.
4	July 31st to August 8th	Flo Salm	Fishing Ops	Frosti Fishing Ltd.
		Scott Wallace	Engineer/Fishing Ops	Frosti Fishing Ltd.
		Derrick Prince	Cook	Frosti Fishing Ltd.
		Chris Roberts	Captain	Frosti Fishing Ltd.
		Rick Stanley	Chief Scientist	DFO
		Malcolm Wyeth	Lab Boss	DFO
		Bernie White	Science	AMR
		Chris Sledz	Science	AMR
		Dan Erskine	Science	AMR
		Rory Johnson	Fishing Ops	Frosti Fishing Ltd.
		Flo Salm	Fishing Ops	Frosti Fishing Ltd.
		Scott Wallace	Engineer/Fishing Ops	Frosti Fishing Ltd.
		Derrick Prince	Cook	Frosti Fishing Ltd.

Notes: AMR = Archipelago Marine Research
DFO = Fisheries and Oceans Canada

Table 3. Definition of survey strata with the target tow allocation and the total area in each.

Areal Stratum	Depth Stratum		Target Tow Allocation	Actual Tow Allocation	Usable Tows	Area (km ²)
	Meters	Fathoms				
South	50 - 125	27 - 68	32	43	34	5,050
	125 - 200	68 - 109	63	75	60	5,481
	200 - 330	109 - 164	27	35	28	2,836
	330 - 500	164 - 273	8	10	8	488
<i>South Total</i>			<i>130</i>	<i>163</i>	<i>130</i>	<i>13,855</i>
North	50 - 125	27 - 68	11	20	10	1,971
	125 - 200	68 - 109	49	61	44	4,135
	200 - 330	109 - 164	43	48	43	3,763
	330 - 500	164 - 273	7	8	6	1,184
<i>North Total</i>			<i>110</i>	<i>137</i>	<i>103</i>	<i>11,053</i>
Grand Total			240	300	233	24,908

Table 4. Mean warp length and scope by depth interval.

Depth (m)	Mean		Mean Scope	Mean	
	Warp (m)	Warp (fa)		Depth (fa)	
50 - 100	285	156	4.1	39	
100 - 150	393	215	3.0	71	
150 - 200	496	271	2.9	93	
200 - 250	588	321	2.6	121	
250 - 300	719	393	2.6	151	
300 - 350	771	421	2.4	177	
350 - 400	853	467	2.3	205	
400 - 450	900	492	2.2	220	
450 - 500	964	527	2.1	257	

Table 5. Summary of survey operations.

Date	Start Fishing	End Fishing	Hours Fishing	Successful Tows	Failed Tows	Total Tows	Travel Day?	Crew Change / Offload Day?
7/7/2009	-	-	-	-	-	-	✓	
7/8/2009	16:47	21:04	5	2	1	3		
7/9/2009	6:07	19:32	13	9	0	9		
7/10/2009	6:11	17:09	11	3	1	4		
7/11/2009	6:02	21:45	15	9	1	10		
7/12/2009	6:15	21:07	15	11	0	11		
7/13/2009	5:58	20:42	15	11	1	12		
7/14/2009	6:04	19:45	13	13	0	13		
7/15/2009	-	-	-	-	-	-		✓
7/16/2009	6:14	21:14	15	9	1	10		
7/17/2009	6:09	21:14	15	11	1	12		
7/18/2009	6:08	20:50	14	12	0	12		
7/19/2009	6:10	19:44	13	11	0	11		
7/20/2009	6:11	20:51	14	11	1	12		
7/21/2009	6:15	20:31	14	9	2	11		
7/22/2009	6:12	20:02	14	11	0	11		
7/23/2009	-	-	-	-	-	-		✓
7/24/2009	7:11	20:14	13	12	0	12		
7/25/2009	7:16	19:08	12	8	2	10		
7/26/2009	6:26	15:05	9	8	0	8		
7/27/2009	6:29	20:38	14	6	2	8		
7/28/2009	7:58	20:27	13	9	0	9		
7/29/2009	6:33	21:00	15	9	1	10		
7/30/2009	6:35	19:27	13	11	0	11		
7/31/2009	-	-	-	-	-	-		✓
8/1/2009	10:47	20:01	10	7	0	7		
8/2/2009	7:29	20:26	13	9	1	10		
8/3/2009	7:02	15:40	8	5	1	6		
8/4/2009	7:06	20:05	13	6	0	6		
8/5/2009	6:39	19:21	13	6	1	7		
8/6/2009	6:43	12:55	6	5	0	5		✓
8/7/2009	-	-	-	-	-	-	✓	
8/8/2009	-	-	-	-	-	-	✓	
Total			338	233	17	250	3	4
Average Per Day			12.5	8.6	0.6	9.3		

Table 6. Catch broken down by species groups.

Species Category	Number of Taxa	Weight (kg)
All fish	90	112,103
Rockfish	28	91,688
Flatfish	13	10,300
Roundfish	8	8,733
Cartilaginous fish	7	1,225
Other fish	34	157
Invertebrates	90	866

Table 7. All captured species showing number of tows in which the species occurred, total catch weight, maximum and mean per-tow catch weight, and relative abundance and relative error from bootstrapped area expanded estimates.

Species	Number of Tows	Catch Weight (kg)			Biomass (tonnes)	Relative Error
		Total	Maximum	Mean		
Pacific ocean perch	147	17,508.8	1,871.5	119.1	12,462.3	0.21
Arrowtooth flounder	213	13,693.6	1,227.3	64.3	9,632.9	0.13
Silvergray rockfish	140	5,566.0	1,323.4	39.8	4,102.9	0.26
Yellowmouth rockfish	62	4,034.4	1,247.4	66.1	2,681.2	0.43
Canary rockfish	59	3,506.4	631.0	59.4	3,518.5	0.33
Pacific hake	83	3,164.5	272.2	38.1	2,297.1	0.15
Spiny dogfish	155	2,925.8	575.9	18.9	2,941.8	0.26
Yellowtail rockfish	57	2,899.9	1,361.4	50.9	2,428.7	0.63
Redstripe rockfish	54	2,798.8	377.7	51.8	1,762.2	0.27
Splitnose rockfish	50	2,043.9	1,379.0	41.7	1,226.7	0.65
Rex sole	178	1,634.1	88.5	9.2	1,133.0	0.12
Dover sole	146	1,500.9	76.0	10.4	1,053.4	0.13
Redbanded rockfish	111	1,375.1	174.9	12.4	893.7	0.16
Sablefish	140	1,228.6	96.9	8.8	953.1	0.12
Shortspine thornyhead	90	1,123.3	78.7	12.5	784.0	0.14
Pacific halibut	68	1,075.0	224.5	15.8	987.7	0.25
Spotted ratfish	178	970.1	104.5	5.5	907.1	0.20
Lingcod	62	761.9	131.1	12.3	726.1	0.29
Pacific cod	95	751.9	131.9	7.9	589.0	0.23
Southern rock sole	40	708.6	221.5	17.7	781.4	0.32
English sole	65	638.5	189.3	9.8	576.1	0.32
Walleye pollock	84	591.7	70.7	7.1	377.4	0.24
Sharpchin rockfish	54	565.1	166.8	10.5	370.4	0.41
Rougheye rockfish	60	561.0	152.8	9.3	360.2	0.25
Longnose skate	55	423.7	56.7	7.7	300.2	0.19
Flathead sole	71	402.6	73.6	5.7	270.9	0.22
Petrale sole	87	350.7	51.8	4.0	318.4	0.25
Greenstriped rockfish	61	273.2	79.5	4.5	167.2	0.29
Darkblotched rockfish	23	264.1	124.2	11.5	179.9	0.49
Yelloweye rockfish	22	180.1	24.3	8.2	136.5	0.27
Jellyfish	53	160.7	19.0	3.2		
Pacific sanddab	27	152.3	47.7	5.9	160.6	0.40
Eulachon	39	122.4	21.7	3.1	79.8	0.30
Shortraker rockfish	5	108.2	41.5	21.6	63.9	0.48
Bocaccio	12	102.1	43.6	8.5	90.8	0.63
Widow rockfish	14	96.6	47.2	6.9	56.5	0.46
Primnoa	11	89.2	21.0	8.1		
Blackbelly eelpout	53	87.9	22.8	1.7	62.3	0.35
Pacific sand lance	17	81.1	42.8	4.8	86.2	0.56
Sponges	35	79.9	8.9	2.5		
Slender sole	100	70.0	4.6	0.7	45.5	0.14
Big skate	7	67.9	29.6	9.7	70.8	0.52
Schoolmaster gonate squid	46	67.8	5.1	1.5		
Glass sponges	29	62.7	10.7	2.5		

Table 7. Continued

Species	Number of Tows	Catch Weight (kg)			Biomass (tonnes)	Relative Error
		Total	Maximum	Mean		
Rosethorn rockfish	24	60.0	10.8	2.5	39.5	0.30
Dusky rockfish	1	57.2	57.2	57.2	31.9	0.97
Pink shrimp (smooth)	90	49.8	4.9	0.8		
Quillback rockfish	10	43.0	10.7	4.3	57.8	0.40
Bath sponges	18	35.3	6.7	2.1		
Sidestripe shrimp	65	21.6	1.7	0.4		
Longspine thornyhead	2	21.1	14.7	10.6	11.3	0.68
Prawn	61	19.5	1.2	0.3		
Sandpaper skate	18	18.8	3.8	1.0	15.1	0.28
Wolf eel	4	18.6	6.9	4.7	16.7	0.49
Bigmouth sculpin	3	16.9	8.9	5.6	10.8	0.63
Metridium	9	16.2	6.9	1.8		
Golden king crab	5	14.9	3.9	3.0		
Fragile urchin	44	14.4	2.6	0.5		
Curlfin sole	13	14.3	5.7	1.1	14.2	0.42
Aleutian skate	2	13.6	6.9	6.8	9.6	0.70
Blackfin sculpin	24	8.0	2.3	0.4	6.1	0.39
Whitespotted sea cucumber	22	8.0	1.5	0.4		
Black eelpout	25	7.8	0.9	0.4	5.5	0.26
Aurora rockfish	4	6.6	2.9	1.6	3.7	0.45
Bigfin eelpout	10	4.5	1.5	0.4	2.7	0.38
Threadfin sculpin	15	4.5	1.3	0.3	3.0	0.36
Spotfin sculpin	10	4.5	3.0	0.6	3.1	0.73
Pacific herring	7	4.4	2.0	0.6	6.1	0.52
Darkfin sculpin	6	4.4	1.8	0.9	2.5	0.50
Kelp greenling	3	3.9	1.9	1.3	4.0	0.58
Soft sea cucumber	14	3.6	1.0	0.5		
Pygmy rockfish	14	3.4	1.0	0.2	2.7	0.36
Sea whip	13	3.2	0.6	0.3		
Skates	1	3.0	3.0	3.0		
Octopus	3	2.9	2.5	1.0		
Oregontriton	23	2.6	0.8	0.3		
Basket star	12	2.5	0.8	0.3		
Squids	2	2.2	2.1	1.1		
Anemone	13	1.9	0.6	0.3		
Sand star	7	1.8	0.5	0.3		
Pacific bobtail squid	38	1.2	0.3	0.1		
Poraniopsis inflata	4	1.2	0.5	0.4		
Sea urchins	3	1.0	0.6	0.3		
Paragorgia	3	1.0	0.5	0.3		
Shortbelly rockfish	1	1.0	1.0	1.0	0.7	1.01
Fish-eating star	6	0.9	0.2	0.2		
Harlequin rockfish	5	0.9	0.3	0.2	0.7	0.50
Stripetail rockfish	1	0.9	0.9	0.9	0.5	1.00

Table 7. Continued

Species	Number of Tows	Catch Weight (kg)			Biomass (tonnes)	Relative Error
		Total	Maximum	Mean		
Brown box crab	2	0.8	0.5	0.4		
Bigeye poacher	34	0.8	0.3	0.1	0.5	0.46
Pacific sardine	3	0.7	0.3	0.2	0.5	0.58
Hagfishes	4	0.7	0.3	0.2		
Heart urchins	11	0.6	0.2	0.1		
Giant red sea cucumber	1	0.6	0.6	0.6		
Mud star	20	0.6	0.2	0.1		
Copper rockfish	1	0.5	0.5	0.5	0.5	0.98
Pacific saury	2	0.5	0.3	0.2	0.3	0.74
Humpback shrimp	7	0.4	0.4	0.4		
Wattled eelpout	2	0.4	0.3	0.2	0.2	0.89
Hippasteria californica	2	0.4	0.3	0.2		
Amphiophiura ponderosa	4	0.3	0.3	0.3		
Bristly crab	2	0.3	0.2	0.2		
Tadpole sculpin	6	0.3	0.1	0.1	0.4	0.47
Moon jelly	1	0.3	0.3	0.3		
Pacific tomcod	1	0.3	0.3	0.3	0.3	0.97
Neptunea	3	0.3	0.2	0.2		
Roughback sculpin	3	0.3	0.1	0.1	0.3	0.59
Henricia sanguinolenta	3	0.3	0.3	0.3		
Spiny red sea star	3	0.3	0.1	0.1		
Cheiraster dawsoni	6	0.3	0.2	0.1		
Cushion star	3	0.2	0.2	0.1		
Brown irish lord	1	0.2	0.2	0.2	0.3	0.97
Opalescent inshore squid	3	0.2	0.1	0.1		
Sea cucumbers	2	0.2	0.2	0.2		
Pallid eelpout	5	0.2	0.1	0.1	0.1	0.66
Dipsacaster anoplus	1	0.2	0.2	0.2		
Salp	11	0.1	0.1	0.1		
Polychaete worms	4	0.1	0.1	0.1		
Pink scallop, (aka reddish scallc	3	0.1	0.1	0.1		
Pacific lamprey	2	0.1	0.1	0.1	0.1	0.85
Starfish	2	0.1	0.1	0.1		
Ophiura sarsi	22	0.1	0.1	0.1		
Nearchaster variabilis	2	0.1	0.1	0.1		
Zaikometopa	1	0.1	0.1	0.1		
Spiny scallop	2	0.1	0.1	0.1		
Solaster paxillatus	1	0.1	0.1	0.1		
Pallid urchin	3	0.1	0.1	0.0		
Isopods	9	0.1	0.1	0.0		
Cookie star	3	0.1	0.0	0.0		
Basket stars	1	0.1	0.1	0.1		
Dorididae	3	0.1	0.1	0.1		
Neptunea amianta	1	0.1	0.1	0.1		
Shortfin eelpout	1	0.1	0.1	0.1	0.0	1.02
Solasteridae	4	0.0	0.0	0.0		

Table 7. Continued

Species	Number of Tows	Catch Weight (kg)			Biomass (tonnes)	Relative Error
		Total	Maximum	Mean		
Periphylla periphylla	7	0.0	0.0	0.0		
Dipsacaster borealis	4	0.0	0.0	0.0		
Vermillion starfish	3	0.0	0.0	0.0		
Winged sea star	1	0.0	0.0	0.0		
Speckled sanddab	1	0.0	0.0	0.0	0.0	1.01
Puget sound rockfish	1	0.0	0.0	0.0	0.0	0.95
Squat lobster	5	0.0	0.0	0.0		
Northern ronquil	2	0.0	0.0	0.0	0.0	0.95
Northern crangon	9					
Henricia	8					
Crangons	8					
Glass shrimp	6					
Pacific viperfish	6					
Northern lampfish	5					
Rose starfish	5					
Snailfishes	5					
Sea lilies and feather stars	4					
Redclaw crab	4					
Ophiopholis	4					
Ophiura	4					
California headlightfish	4					
Papillose sea cucumber	3					
Sea mouse	3					
Smalldisk snailfish	3					
Pterasteridae	2					
Blue-eyed searcher	2					
Argis	2					
Graceful decorator crab	2					
Lampreys	2					
Dusky sculpin	2					
Eualus	2					
Fish eggs	1					
Gastropods	1					
Flatworms	1					
Florometra asperrima	1					
Lampshells	1					
Goniasteridae	1					
Ascidians and tunicates	1					
Adams spiny margarite	1					
Blue lanternfish	1					
Bryozoa	1					
Ceramaster japonicus	1					
Common argid	1					
Ribbed sculpin	1					
Right-handed hermits	1					
Peanutworms	1					

Table 7. Continued.

Species	Number of Tows	Catch Weight (kg)			Biomass (tonnes)	Relative Error
		Total	Maximum	Mean		
Primnoidae	1					
Proboscis worm	1					
Pseudarchaster alascensis	1					
Molgula	1					
Lophaster furcilliger vexator	1					
Mediaster	1					
Pagurus	1					
Soft sculpin	1					
Spiral margarite	1					
Shining tubeshoulder	1					
Stylaster	1					
Trochacea	1					
Long-armed sea star	1					
Hyale	1					
Threadfin sculpin	1					
Robust clubhook squid	1					
Polychaete worms	1					
Pygmy snailfish	1					
Northern crangon	1					
Ophiurida	1					
Solasteridae	1					
Sea cucumbers	1					
Neptunea	1					
Acanthasteridae	1					
Ophiura sarsi	1					
Ceramaster clarki	1					
Ceramaster japonicus	1					
Longfin dragonfish	1					
Deepsea spinyhead	1					
Solaster hypothyrsus	1					
Notostomus	1					
Zoroasteridae	1					
Pink shrimp (smooth)	1					
Ampheraster marianus	1					
Chirostylidae	1					

Table 8. Offloaded catch weight by species.

Species	Weight (kg)
Canary Rockfish	94.3
Darkblotched Rockfish	89.8
Dover Sole	77.1
English Sole	10.0
Greenstriped Rockfish	69.9
Pacific Ocean Perch	12,506.0
Quillback Rockfish	2.7
Redbanded Rockfish	57.6
Redstripe Rockfish	334.8
Rosethorn Rockfish	0.9
Rougheye Rockfish	114.3
Sharpchin Rockfish	23.1
Shortspine Thornyhead	485.8
Silvergray Rockfish	1,710.0
Splitnose Rockfish	877.7
Widow Rockfish	14.1
Yellowmouth Rockfish	1,979.0
Yellowtail Rockfish	656.8
Total	19,103.9

Table 9. Number of samples and number of recorded biological attributes per species sampled.

Species	Samples	Lengths	Weights	Sexes	Maturities	Ages
Aleutian skate	1	1	1	1	0	0
Arrowtooth flounder	138	3,661	2,714	3,660	2,336	2,321
Aurora rockfish	4	8	1	8	0	0
Big skate	7	11	11	11	0	0
Black eelpout	5	80	0	0	0	0
Blackbelly eelpout	26	719	0	0	0	0
Blackfin sculpin	4	127	0	0	0	0
Bocaccio	12	25	25	25	25	25
Canary rockfish	57	509	382	509	382	381
Copper rockfish	1	1	0	1	0	0
Curlfin sole	13	37	16	37	0	0
Darkblotched rockfish	23	176	90	176	88	88
Darkfin sculpin	3	50	0	0	0	0
Dover sole	61	1,339	563	1,339	537	537
Dusky rockfish	1	37	37	37	37	37
English sole	27	763	590	763	450	450
Eulachon	25	853	0	0	0	0
Flathead sole	37	844	311	844	183	183
Greenstriped rockfish	35	442	108	442	28	28
Harlequin rockfish	4	4	1	4	0	0
Kelp greenling	3	6	0	6	0	0
Lingcod	64	193	177	192	91	91
Longnose skate	52	78	78	77	0	0
Longspine thornyhead	2	66	36	65	0	0
Pacific cod	94	616	545	616	422	247
Pacific hake	32	913	625	913	439	441
Pacific halibut	67	202	199	5	0	0
Pacific herring	2	28	0	0	0	0
Pacific ocean perch	100	2,703	2,310	2,703	2,187	2,187
Pacific sand lance	12	451	0	0	0	0
Pacific sanddab	11	305	135	305	63	63
Pacific saury	1	6	0	0	0	0
Petrale sole	86	496	308	496	308	288
Pygmy rockfish	11	57	0	57	0	0
Quillback rockfish	10	49	25	49	25	25
Redbanded rockfish	74	809	655	809	655	655
Redstripe rockfish	30	831	572	831	565	571
Rex sole	84	2,338	1,116	2,339	985	985
Rosethorn rockfish	9	175	67	175	67	67
Rougheye rockfish	60	429	372	428	370	371
Sablefish	141	781	206	781	190	190
Sandpaper skate	17	19	19	19	0	0
Sharpchin rockfish	23	414	195	411	124	125
Shortbelly rockfish	1	11	0	11	0	0
Shortraker rockfish	5	17	17	17	16	17
Shortspine thornyhead	68	1,703	724	1,692	402	403
Silvergray rockfish	89	1,376	770	1,376	759	760
Skates	1	1	1	1	0	0
Slender sole	39	505	0	505	0	0
Southern rock sole	39	399	293	400	292	292
Spiny dogfish	33	502	311	502	279	277
Splitnose rockfish	22	486	263	487	260	263
Spotfin sculpin	1	15	0	0	0	0
Spotted ratfish	53	1302	437	1302	0	0
Stripetail rockfish	1	5	0	5	0	0
Tadpole sculpin	1	38	0	0	0	0
Walleye pollock	50	816	161	816	125	125
Widow rockfish	14	61	2	61	0	0
Wolf eel	1	1	1	0	0	0
Yelloweye rockfish	25	54	54	54	54	54
Yellowmouth rockfish	31	611	420	610	418	420
Yellowtail rockfish	21	423	293	424	282	283
Total	1,962	29,978	16,237	27,397	13,444	13,250

Table 10. Numbers of samples and specimens by sample type and species.

Species	Total		Len./Sex		Len./Sex/Wt.		Len./Sex/Wt./Age	
	N	n	N	n	N	n	N	n
Aleutian skate	1	1	0	0	1	1	0	0
Arrowtooth flounder	138	3,661	38	948	13	392	87	2,321
Aurora rockfish	4	8	3	7	1	1	0	0
Big skate	7	11	0	0	7	11	0	0
Black eelpout	5	80	5	80	0	0	0	0
Blackbelly eelpout	26	719	26	719	0	0	0	0
Blackfin sculpin	4	127	4	127	0	0	0	0
Bocaccio	12	25	0	0	0	0	12	25
Canary rockfish	57	509	41	127	0	0	16	381
Copper rockfish	1	1	1	1	0	0	0	0
Curfin sole	13	37	11	21	2	16	0	0
Darkblotched rockfish	23	176	18	86	2	2	3	88
Darkfin sculpin	3	50	3	50	0	0	0	0
Dover sole	61	1,339	39	776	1	26	21	537
Dusky rockfish	1	37	0	0	0	0	1	37
English sole	27	763	7	173	4	140	16	450
Eulachon	25	853	25	853	0	0	0	0
Flathead sole	37	844	27	533	4	128	6	183
Greenstriped rockfish	35	442	31	334	3	80	1	28
Harlequin rockfish	4	4	3	3	1	1	0	0
Kelp greenling	3	6	3	6	0	0	0	0
Lingcod	64	193	9	16	47	85	7	91
Longnose skate	52	78	0	0	50	77	0	0
Longspine thornyhead	2	66	1	30	1	36	0	0
Pacific cod	94	616	30	71	41	123	23	247
Pacific hake	32	913	11	288	6	184	15	441
Pacific halibut	67	202	2	2	3	4	0	0
Pacific herring	2	28	2	28	0	0	0	0
Pacific ocean perch	100	2,703	22	395	4	114	74	2,187
Pacific sand lance	12	451	12	451	0	0	0	0
Pacific sanddab	11	305	7	170	2	72	2	63
Pacific saury	1	6	1	6	0	0	0	0
Petrale sole	86	496	67	188	0	0	19	288
Pygmy rockfish	11	57	11	57	0	0	0	0
Quillback rockfish	10	49	8	24	0	0	2	25
Redbandeo rockfish	74	809	36	154	0	0	38	655
Redstripe rockfish	30	831	12	259	0	0	18	571
Rex sole	84	2,338	44	1,222	5	130	35	985
Rosethorn rockfish	9	175	7	108	0	0	2	67
Rougheye rockfish	60	429	34	56	1	2	25	371
Sablefish	141	781	131	575	3	16	7	190
Sandpaper skate	17	19	0	0	17	19	0	0
Sharpchin rockfish	23	414	17	220	2	69	4	125
Shortbelly rockfish	1	11	1	11	0	0	0	0
Shortraker rockfish	5	17	0	0	0	0	5	17
Shortspine thornyhead	66	1,703	40	979	12	320	14	403
Silvergray rockfish	89	1,376	59	606	1	10	29	760
Skates	1	1	0	0	1	1	0	0
Slender sole	39	505	39	505	0	0	0	0
Southern rock sole	39	399	27	107	0	0	12	292
Spiny dogfish	33	502	22	191	1	32	10	277
Splitnose rockfish	22	486	13	224	0	0	9	263
Spotfin sculpin	1	15	1	15	0	0	0	0
Spotted ratfish	53	1,302	40	865	13	437	0	0
Stripetail rockfish	1	5	1	5	0	0	0	0
Tadpole sculpin	1	38	1	38	0	0	0	0
Walleye pollock	50	816	45	655	1	36	4	125
Widow rockfish	14	61	13	59	1	2	0	0
Wolf eel	1	1	0	0	0	0	0	0
Yelloweye rockfish	25	54	0	0	0	0	25	54
Yellowmouth rockfish	31	611	18	191	0	0	15	420
Yellowtail rockfish	21	423	10	131	1	10	10	283
Total	1,962	29,978	1,077	13,746	252	2,577	567	13,250

Table 11. Statistics of individual length and weight, and sex proportion by species.

Species	Length (cm)			Weight (kg)			Sex Proportion	
	Min.	Max.	Mean	Min.	Max.	Mean	Male	Female
Aleutian skate	103	103	103	6.9	6.9	6.9	0.00	1.00
Arrowtooth flounder	13	80	38	0.0	5.0	0.7	0.40	0.60
Aurora rockfish	32	39	36	0.8	0.8	0.8	0.50	0.50
Big skate	49	118	84	1.0	14.1	6.2	0.55	0.45
Black eelpout	7	39	21				0.00	0.00
Blackbelly eelpout	6	27	18				0.00	0.00
Blackfin sculpin	7	21	13				0.00	0.00
Bocaccio	61	75	68	2.7	5.4	4.0	0.84	0.16
Canary rockfish	10	62	48	0.5	3.7	1.9	0.56	0.44
Copper rockfish	29	29	29				0.00	1.00
Curlfin sole	24	34	29	0.2	0.5	0.4	0.51	0.49
Darkblotched rockfish	12	50	36	0.5	2.1	1.0	0.61	0.39
Darkfin sculpin	6	21	15				0.00	0.00
Dover sole	25	60	36	0.2	2.4	0.6	0.64	0.36
Dusky rockfish	41	49	45	1.1	1.8	1.5	0.59	0.41
English sole	20	46	32	0.1	1.1	0.3	0.39	0.61
Eulachon	7	20	16				0.00	0.00
Flathead sole	10	40	28	0.0	0.5	0.2	0.42	0.58
Greenstriped rockfish	13	37	28	0.1	0.6	0.3	0.53	0.47
Harlequin rockfish	22	24	23	0.2	0.2	0.2	0.25	0.75
Kelp greenling	8	37	29				0.33	0.67
Lingcod	33	109	72	0.3	12.4	4.1	0.18	0.82
Longnose skate	50	127	90	0.7	13.5	5.2	0.50	0.49
Longspine thornyhead	10	28	19	0.0	0.3	0.1	0.40	0.58
Pacific cod	3	86	39	0.0	4.2	0.8	0.47	0.53
Pacific hake	38	69	52	0.4	1.6	0.9	0.42	0.58
Pacific halibut	50	148	75	1.3	38.4	5.3	0.00	0.02
Pacific herring	19	25	21				0.00	0.00
Pacific ocean perch	7	60	34	0.0	2.0	0.7	0.54	0.46
Pacific sand lance	8	20	13				0.00	0.00
Pacific sanddab	12	32	22	0.0	0.3	0.1	0.52	0.48
Pacific saury	23	24	23				0.00	0.00
Petrale sole	17	62	37	0.1	2.5	0.6	0.65	0.35
Pygmy rockfish	10	23	16				0.33	0.67
Quillback rockfish	19	44	34	0.1	1.5	0.8	0.55	0.45
Redbanded rockfish	7	65	41	0.0	4.9	1.3	0.57	0.43
Redstripe rockfish	7	42	30	0.0	1.1	0.4	0.43	0.57
Rex sole	15	47	30	0.0	0.5	0.2	0.63	0.37
Rosethorn rockfish	16	35	26	0.1	0.5	0.3	0.51	0.49
Rougheye rockfish	8	63	39	0.0	3.8	1.1	0.56	0.44
Sablefish	32	94	50	0.3	5.4	1.5	0.58	0.42
Sandpaper skate	30	90	52	0.1	3.8	1.0	0.32	0.68
Sharpchin rockfish	6	49	23	0.0	0.8	0.3	0.44	0.55
Shortbelly rockfish	19	23	20				0.55	0.45
Shortraker rockfish	58	91	72	3.1	13.1	6.3	0.24	0.76
Shortspine thornyhead	7	67	27	0.0	4.0	0.3	0.53	0.46
Silvergray rockfish	15	67	51	0.4	3.7	1.8	0.65	0.35
Skates	83	83	83	3.0	3.0	3.0	0.00	1.00
Slender sole	13	65	23				0.35	0.65
Southern rock sole	11	53	35	0.0	2.2	0.7	0.30	0.70
Spiny dogfish	44	118	72	0.4	3.1	1.4	0.70	0.30
Splitnose rockfish	8	39	24	0.0	0.9	0.3	0.57	0.43
Spotfin sculpin	13	29	24				0.00	0.00
Spotted ratfish	8	49	27	0.0	1.3	0.4	0.50	0.50
Stripetail rockfish	21	27	24				0.00	1.00
Tadpole sculpin	4	7	6				0.00	0.00
Walleye pollock	9	66	35	0.1	2.2	0.9	0.40	0.60
Widow rockfish	32	57	46	2.1	2.1	2.1	0.61	0.39
Wolf eel	141	141	141	4.9	4.9	4.9	0.00	0.00
Yelloweye rockfish	31	71	55	0.5	6.3	3.4	0.50	0.50
Yellowmouth rockfish	10	53	39	0.0	2.1	1.2	0.46	0.53
Yellowtail rockfish	20	58	45	0.7	2.8	1.5	0.60	0.40

Table 12. Data collected from net sensors, showing the number of tows from which each data type was collected (total number of survey tows is 277).

Sensor	Attribute	Number of Tows	Number of Records
Global Positioning System (GPS)	Vessel Direction - Compass Bearing True North	250	135,408
	Vessel Position - Latitude	250	154,208
	Vessel Position - Longitude	250	154,208
	Vessel Speed Over Ground	250	135,408
NMFS Bottom Contact Sensor	Bottom Contact Sensor Tilt Angle	246	86,219
Scanmar Scanbas SRU 06 / SGM15	Bottom Depth	250	227,886
	Net Depth	65	56,840
	Trawl Net Doorspread	248	226,026
	Trawl Net Footrope To Headline Distance (Opening)	245	222,169
Seabird SBE 19plus Seacat Profiler	Water Temperature At Net Depth	63	56,626
	Dissolved Oxygen	193	31,835
	Net Depth	193	31,835
	Salinity At Net Depth	193	31,835
Seabird SBE 39 Temperature and Depth Sensor	Water Temperature At Net Depth	193	31,835
	Net Depth	247	41,591
	Water Temperature At Net Depth	247	41,591

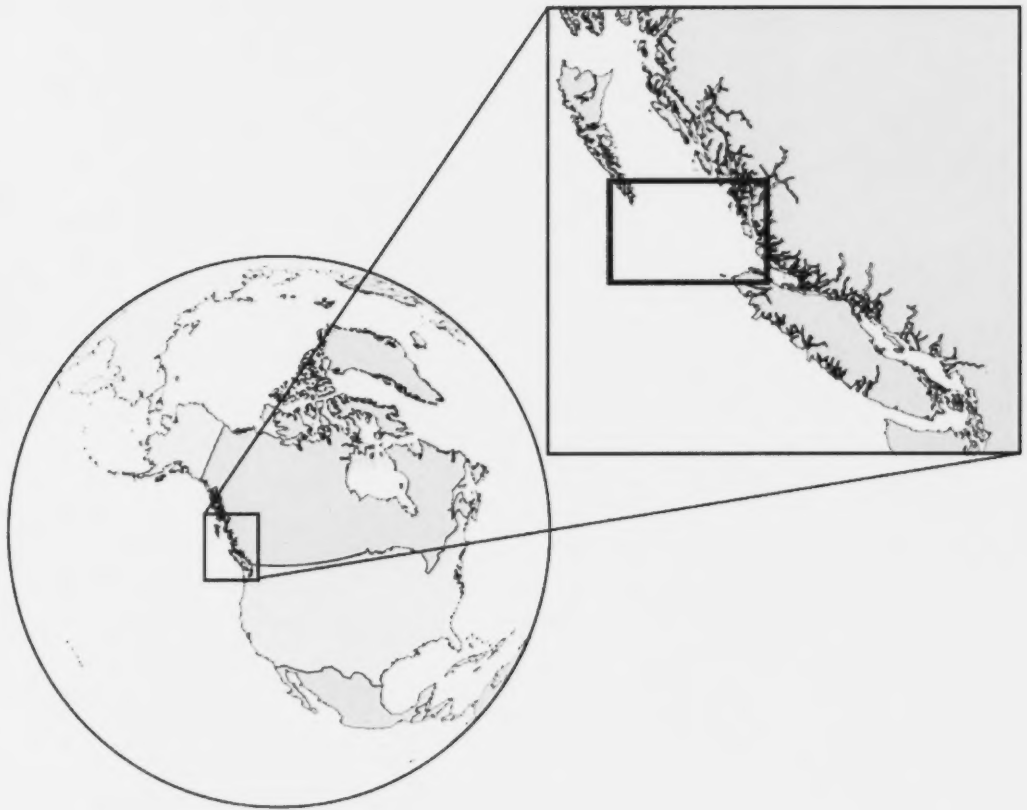


Figure 1. Location of Queen Charlotte Sound on the coast of British Columbia, Canada.



Figure 2. The commercial stern trawler F/V Viking Storm.

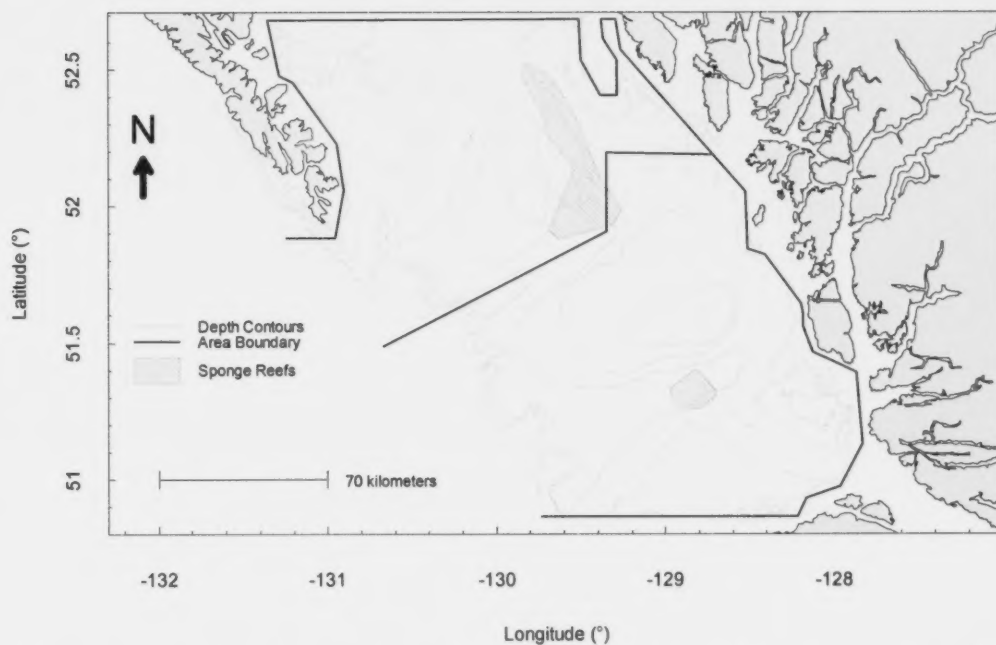


Figure 3. The Queen Charlotte Sound study area showing area boundary, sponge reef protected areas, and depth contours.

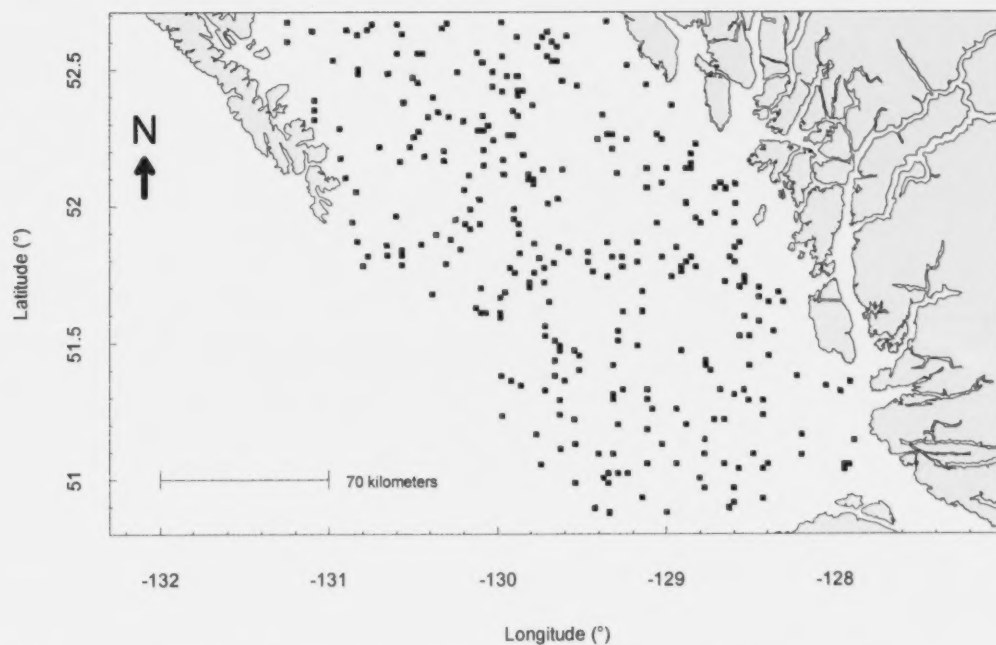


Figure 4. Initial status of the sampling frame showing the 300 primary fishing locations.

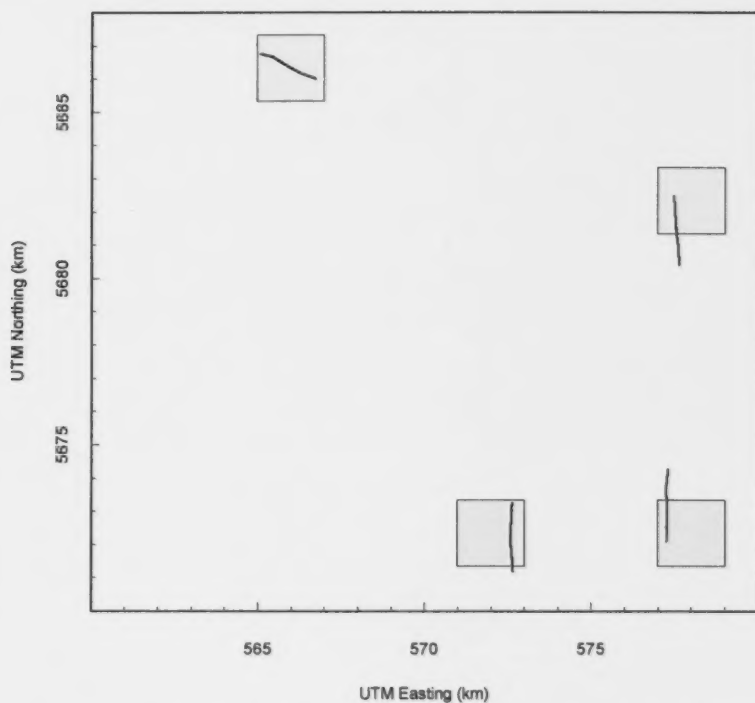


Figure 5. Example tow tracks demonstrating variations in track location within blocks.

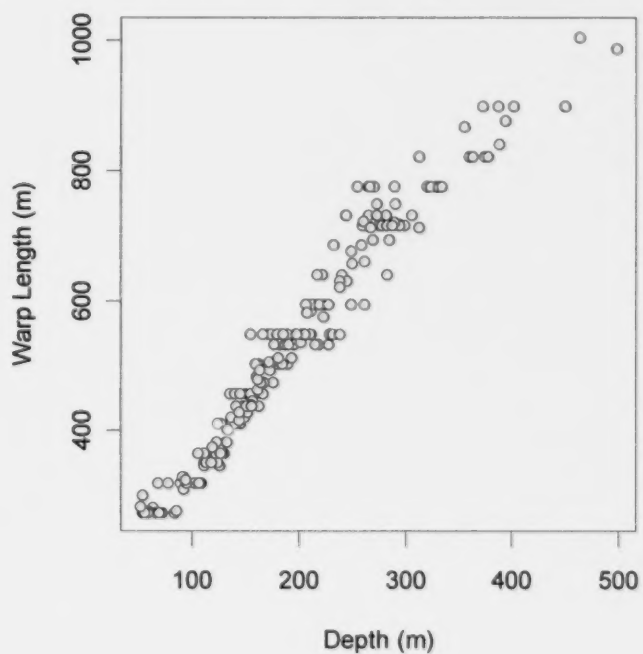


Figure 6. Warp length vs. starting depth.

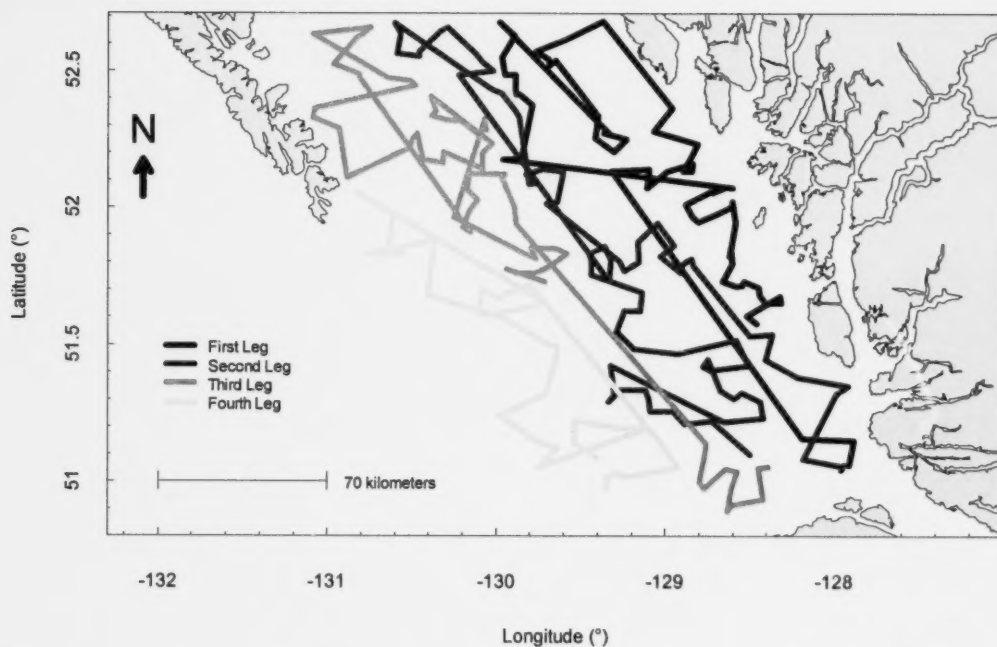


Figure 7. The paths followed on each leg of the survey.

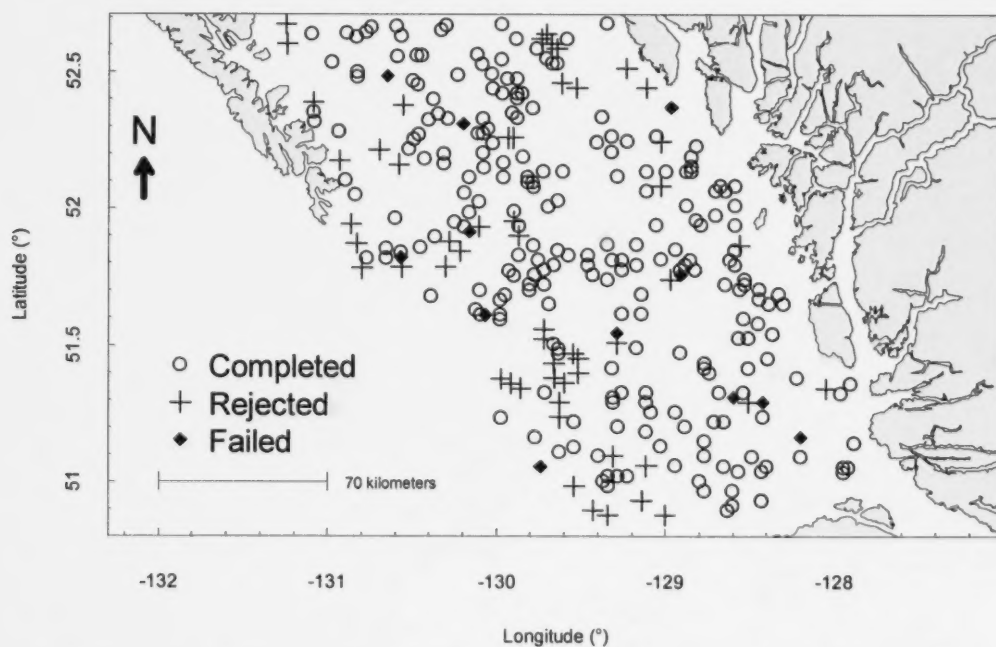


Figure 8. Final status of the sampling frame showing locations that were fished successfully (completed), rejected prior to fishing (rejected), or abandoned after one or more unsuccessful fishing attempts (failed).

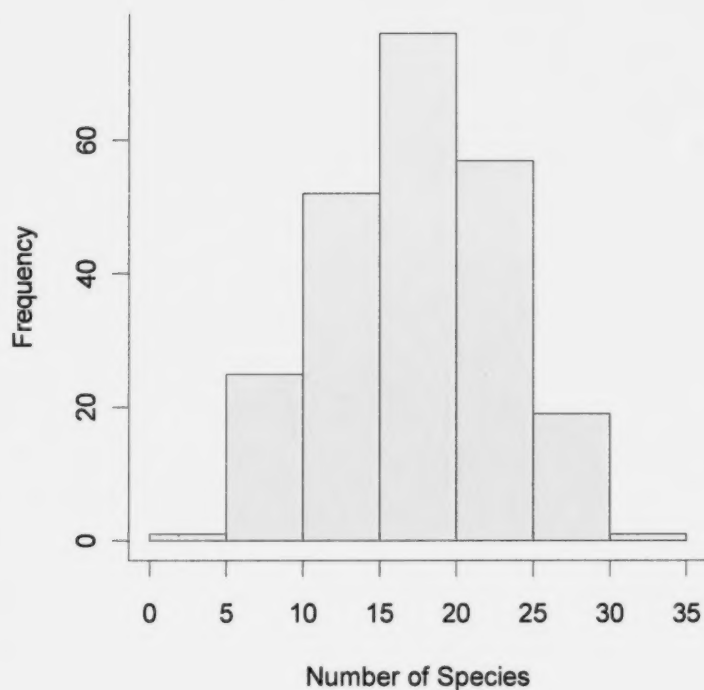


Figure 9. Histogram of number of species caught per tow.

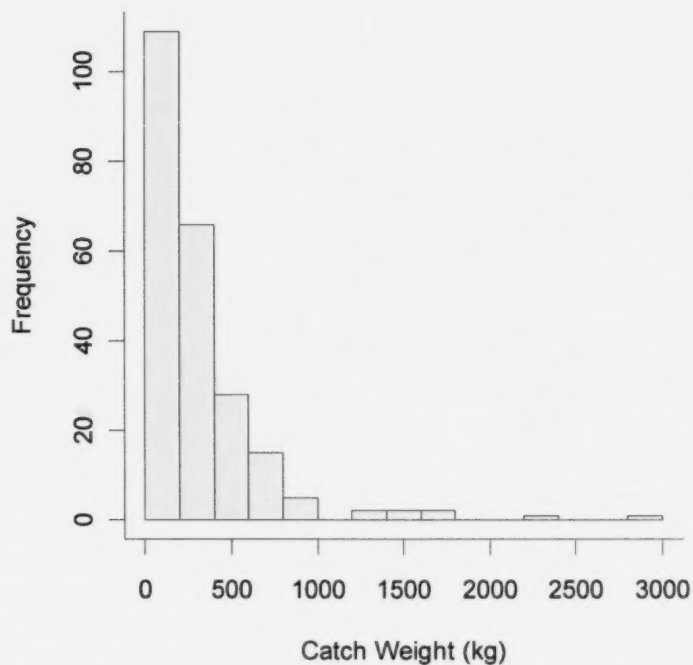


Figure 10. Histogram of catch weight per tow.

Species		2003	2004	2005	2007	2009
Arrowtooth flounder		6,116.6	12,542.3	14,513.8	7,777.0	9,632.9
Blackbelly eelpout		56.1	157.3	287.7	44.1	62.3
Blackfin sculpin		9.3	13.1	6.6	2.6	6.1
Dover sole		1,897.1	2,619.9	1,955.6	923.7	1,053.4
English sole		1,179.6	1,234.9	892.6	358.1	576.1
Flathead sole		575.8	1,092.0	967.2	344.0	270.9
Greenstriped rockfish		119.5	248.7	136.6	141.1	167.2
Lingcod		742.3	774.5	546.9	583.1	726.1
Longnose skate		514.2	570.6	599.0	293.8	300.2
Pacific cod		874.5	1,735.0	1,623.1	456.2	589.0
Pacific hake		1,218.8	5,958.4	5,928.9	3,381.0	2,297.1
Pacific halibut		834.1	1,024.7	1,171.4	1,318.6	987.7
Pacific ocean perch		23,783.4	18,043.5	15,194.7	11,411.0	12,462.3
Pacific sanddab		1,226.6	976.3	370.3	184.5	160.6
Petrale sole		322.9	418.1	423.9	222.7	318.4
Redbanded rockfish		1,050.8	601.7	1,293.9	951.4	893.7
Rex sole		2,483.0	2,390.9	2,081.2	973.0	1,133.0
Rosethorn rockfish		85.5	99.1	73.7	59.3	39.5
Roughey rockfish		948.5	834.7	534.1	291.0	360.2
Sablefish		1,168.1	1,781.0	1,126.7	881.7	953.1
Sandpaper skate		23.4	15.0	18.1	16.7	15.1
Shortspine thornyhead		1,017.7	1,262.8	945.5	529.0	784.0
Silvergray rockfish		2,497.6	4,242.9	2,977.1	3,811.7	4,102.9
Slender sole		91.3	87.7	66.7	39.2	45.5
Southern rock sole		739.7	1,521.6	1,032.7	650.9	781.4
Walleye pollock		267.9	384.9	677.1	525.9	377.4
Yelloweye rockfish		217.5	326.1	281.2	156.1	136.5
Yellowmouth rockfish		1,745.5	4,003.5	1,699.4	1,501.3	2,681.2

Figure 11. Biomass indices (tonnes) of selected species from all years of the Queen Charlotte Sound survey.

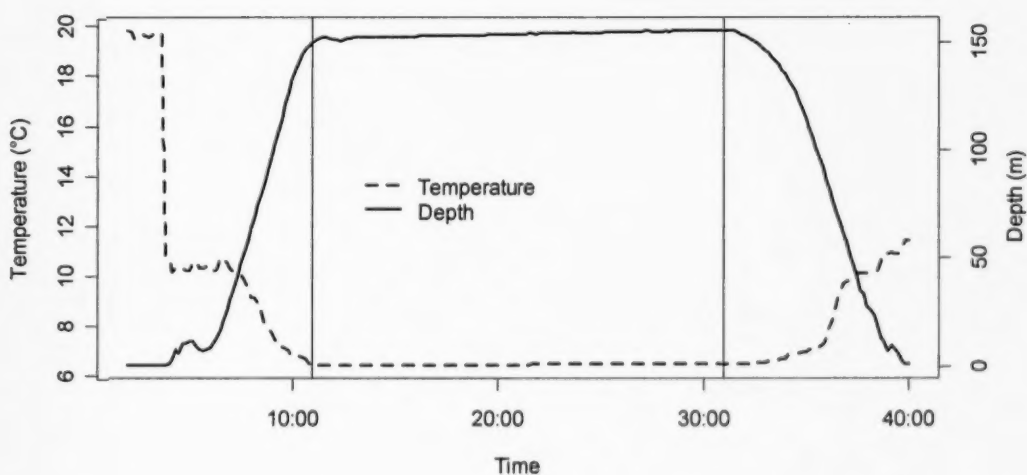


Figure 12. Example of a Seabird 39 temperature and depth profile. The vertical lines indicate the start and end of net contact with the sea floor.

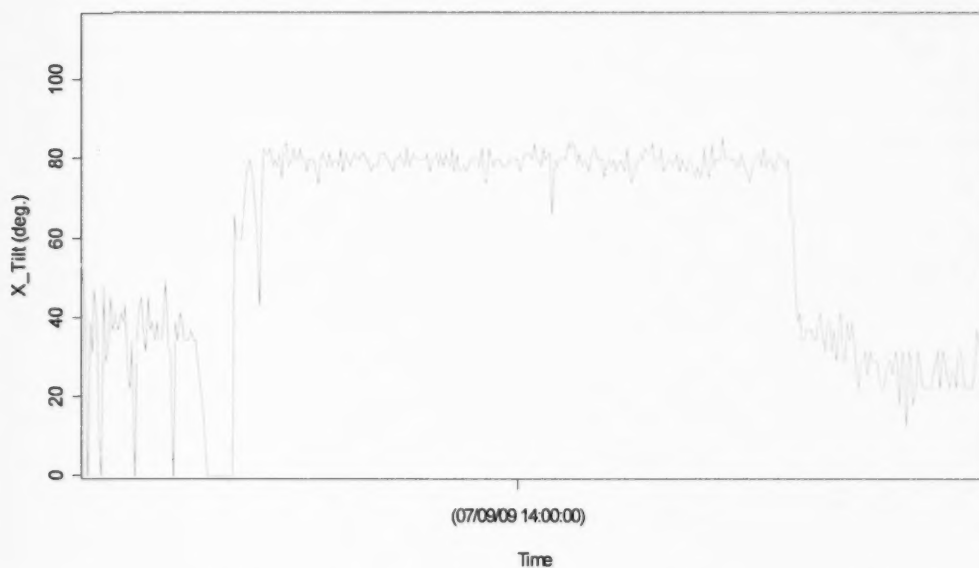


Figure 13. NMFS bottom contact sensor profile from tow number 8. The raised segment in the middle of the profile at approximately 80° indicates where the net made contact with the sea floor.

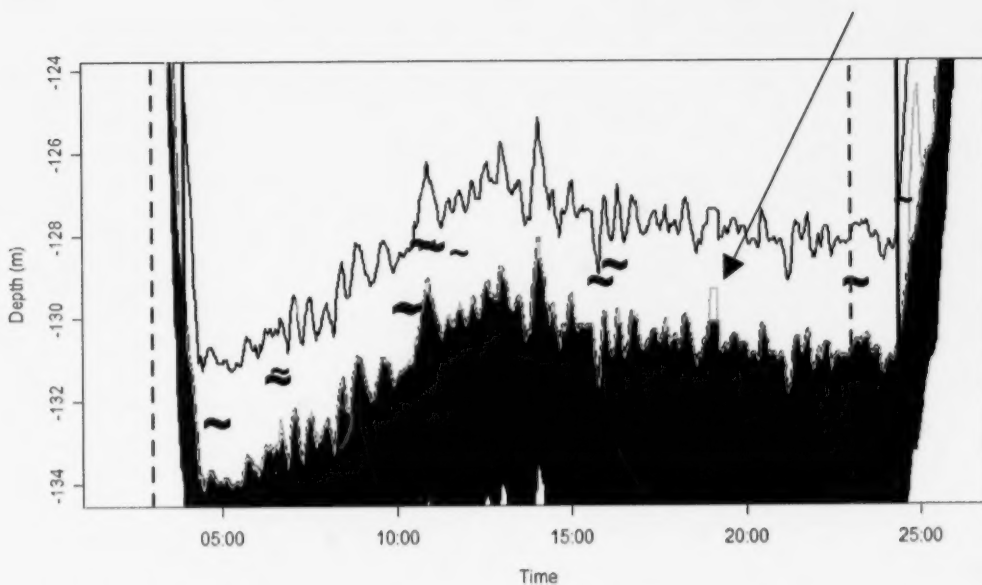


Figure 14. Example plot of net sensor data. The solid dark area at the bottom represents the sea floor. The light grey line directly above that represents the net footrope (note the region indicated by the arrow, showing where the net has risen off the sea floor for a brief period). The top line indicates the net headrope. The symbols between the headrope and the footrope indicate where fish have entered the net.

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APPENDIX A: BRIDGE LOG

Tow	Date	Time	Latitude	Longitude	Depth (m)	Duration (min)	Speed (km/h)	Warp (m)	Catch (kg)	Usable?
1	Jul 8	16:38	51.0585	127.9115	155	19	5.7	549	293.7	Yes
2	Jul 8	18:45	51.1500	127.8857	119	20	5.9	366	295.4	Yes
3	Jul 8	20:44	51.1577	128.1867	115	14	6.1	366	184.0	No
4	Jul 9	06:00	52.1320	129.3165	167	19	6.3	549	153.9	Yes
5	Jul 9	07:46	52.1413	129.1012	130	19	5.5	366	47.4	Yes
6	Jul 9	09:12	52.0735	129.1118	145	19	5.1	412	53.7	Yes
7	Jul 9	11:35	52.1322	128.9930	171	19	6.3	503	561.0	Yes
8	Jul 9	13:41	52.1630	128.8412	219	20	5.9	594	24.1	Yes
9	Jul 9	15:09	52.1327	128.8457	213	19	5.5	594	208.9	Yes
10	Jul 9	16:35	52.1312	128.8963	198	19	5.3	549	81.7	Yes
11	Jul 9	17:52	52.1823	128.8493	212	19	5.5	549	64.8	Yes
12	Jul 9	19:04	52.2335	128.8123	204	19	5.5	549	47.8	Yes
13	Jul 10	06:03	52.2790	129.0688	176	19	5.5	476	74.7	Yes
14	Jul 10	09:04	52.3630	128.9613	121	15	5.3	366	66.1	No
15	Jul 10	14:03	52.6830	129.3692	105	19	5	320	221.0	Yes
16	Jul 10	16:42	52.6187	129.5863	142	19	5	439	386.4	Yes
17	Jul 11	05:53	52.5705	129.7668	162	20	5.5	503	143.2	Yes
18	Jul 11	07:18	52.5445	129.6962	151	19	5.3	439	69.4	Yes
19	Jul 11	08:45	52.5210	129.6883	148	19	5.5	439	84.9	Yes
20	Jul 11	10:33	52.5400	129.6550	154	19	6.4	439	73.4	Yes
21	Jul 11	14:06	52.3375	129.4017	138	19	5.9	412	99.9	Yes
22	Jul 11	15:45	52.2547	129.4147	160	19	5.3	503	188.9	Yes
23	Jul 11	17:06	52.2055	129.3053	163	19	5.3	503	46.3	Yes
24	Jul 11	18:40	52.2507	129.2348	172	19	6.1	549	58.3	Yes
25	Jul 11	20:13	52.2717	129.3623	147	19	6.1	457	66.2	No
26	Jul 11	21:20	52.2703	129.3370	154	19	5.7	457	69.0	Yes
27	Jul 12	05:59	52.6793	129.9803	266	19	5.7	777	90.4	Yes
28	Jul 12	07:34	52.6288	129.8942	255	19	6.3	777	100.9	Yes
29	Jul 12	08:58	52.5507	129.9700	267	19	5.9	777	98.3	Yes
30	Jul 12	10:15	52.4863	129.9505	245	19	5.5	732	70.8	Yes
31	Jul 12	11:44	52.4850	129.8892	233	19	5.1	686	301.9	Yes
32	Jul 12	12:54	52.4295	129.8865	222	19	4.8	640	101.9	Yes
33	Jul 12	13:58	52.4135	129.8820	218	19	5.7	640	125.7	Yes
34	Jul 12	14:58	52.4150	129.8648	221	19	5.1	594	75.7	Yes
35	Jul 12	16:11	52.3747	129.7905	223	19	5.5	594	124.9	Yes
36	Jul 12	19:22	52.1778	129.8540	152	15			21.9	Yes
37	Jul 12	20:41	52.1750	129.9642	148	19	5.7	457	125.2	Yes
38	Jul 13	05:51	52.0718	128.6013	163	19	5.3	439	1,277.1	Yes
39	Jul 13	07:14	52.0745	128.6438	172	19	5.5	503	197.9	Yes
40	Jul 13	09:01	52.0555	128.7230	184	20		549	77.1	Yes
41	Jul 13	10:02	52.0703	128.7007	207	20	5.1	549	147.1	Yes
42	Jul 13	11:43	52.0102	128.8788	199	19	5.3	549	111.2	Yes
43	Jul 13	12:55	51.9648	128.8412	127	20	5.3	412	284.4	Yes

Appendix A continued.

Tow	Date	Time	Latitude	Longitude	Depth (m)	Duration (min)	Speed (km/h)	Warp (m)	Catch (kg)	Usable?
44	Jul 13	13:45	51.9490	128.8043	136	19	4.8	457	939.9	Yes
45	Jul 13	14:57	51.9727	128.7165	160	19	5.9	503	306.3	Yes
46	Jul 13	16:15	52.0053	128.6015	155	3	5.7	457	150.4	No
47	Jul 13	17:19	52.0238	128.6053	158	19	5.1	457	163.9	Yes
48	Jul 13	18:29	51.9468	128.5852	158	19	5.1	457	255.2	Yes
49	Jul 13	20:16	51.8225	128.6240	142	19	5.9	457	237.5	Yes
50	Jul 14	05:59	51.8525	128.6143	141	20	5.7	457	192.2	Yes
51	Jul 14	07:09	51.7995	128.6013	141	19	5.3	457	113.6	Yes
52	Jul 14	08:43	51.7290	128.6597	67	19	5.5	274	13.7	Yes
53	Jul 14	09:40	51.7110	128.5785	124	19	5.9	412	225.9	Yes
54	Jul 14	10:37	51.7167	128.5482	146	19	5.3	457	405.3	Yes
55	Jul 14	11:34	51.7307	128.5328	150	19	5	457	187.0	Yes
56	Jul 14	12:52	51.7100	128.4487	147	20	5.5	457	121.7	Yes
57	Jul 14	13:46	51.6805	128.4448	147	19	5.7	457	426.4	Yes
58	Jul 14	14:40	51.6503	128.4068	145	19	5.7	457	196.8	Yes
59	Jul 14	15:37	51.6513	128.3152	145	19	5.5	457	752.1	Yes
60	Jul 14	16:39	51.6777	128.3225	137	19	5.1	412	640.9	Yes
61	Jul 14	18:18	51.6062	128.5200	155	19	6.1	457	248.3	Yes
62	Jul 14	19:17	51.5775	128.4618	174	20	5.9	549	145.8	Yes
63	Jul 16	06:04	51.0413	127.9583	150	19	5.7	439	594.6	Yes
64	Jul 16	07:10	51.0605	127.9405	157	1	4.4	446	24.5	No
65	Jul 16	07:46	51.0558	127.9593	156	19	6.1	441	456.7	Yes
66	Jul 16	09:38	51.0820	128.1862	161	19	6.3	485	260.1	Yes
67	Jul 16	12:47	51.3203	127.9858	162	19	7.2	479	665.1	Yes
68	Jul 16	13:55	51.3498	127.9198	134	19	5.5	402	154.9	Yes
69	Jul 16	16:35	51.3790	128.2187	123	14	6.4	384	194.4	Yes
70	Jul 16	18:13	51.4452	128.4095	180	19	5.9	549	108.1	Yes
71	Jul 16	19:31	51.5360	128.3655	175	19	5.3	507	296.6	Yes
72	Jul 16	20:46	51.5305	128.5005	186	19	5.3	549	339.5	Yes
73	Jul 17	06:04	51.7873	128.8367	64	19	5.9	282	116.7	Yes
74	Jul 17	07:03	51.8110	128.8473	66	19	7.2	274	42.6	Yes
75	Jul 17	08:24	51.8023	128.8833	54	18	6.3	274	245.9	Yes
76	Jul 17	09:26	51.7835	128.9148	60	16	6.3	276	184.6	Yes
77	Jul 17	10:17	51.7618	128.9090	69	12	6.4	274	117.2	No
78	Jul 17	13:14	51.8240	129.0302	107	19	6.3	320	570.9	Yes
79	Jul 17	14:39	51.8605	128.9492	86	15	6.3	278	656.0	Yes
80	Jul 17	16:19	51.9455	129.0472	122	19	5.3	366	596.6	Yes
81	Jul 17	17:42	51.8750	129.1610	128	19	5.3	366	100.5	Yes
82	Jul 17	18:48	51.8005	129.1570	114	18	6.1	366	280.8	Yes
83	Jul 17	19:47	51.7705	129.2453	112	19		366	663.2	Yes
84	Jul 17	20:53	51.8065	129.2717	127	16	5.9	366	106.4	Yes
85	Jul 18	06:01	52.0147	129.7045	156	19	6.8	439	310.3	Yes
86	Jul 18	07:10	52.0215	129.6427	204	20	7	549	265.0	Yes

Appendix A continued.

Tow	Date	Time	Latitude	Longitude	Depth (m)	Duration (min)	Speed (km/h)	Warp (m)	Catch (kg)	Usable?
87	Jul 18	08:36	52.1317	129.6092	223	19	5.5	576	66.0	Yes
88	Jul 18	10:09	52.1415	129.7252	208	19	5.7	582	16.9	Yes
89	Jul 18	11:45	52.1225	129.8287	164	19	6.1	494	83.0	Yes
90	Jul 18	12:41	52.1030	129.8007	137	19	5.5	421	256.7	Yes
91	Jul 18	13:33	52.0885	129.7633	112	19	6.1	366	672.7	Yes
92	Jul 18	14:23	52.0878	129.8097	119	18	5.7	375	90.6	Yes
93	Jul 18	17:12	52.3272	129.8668	185	17	6.6	503	192.1	Yes
94	Jul 18	18:01	52.3533	129.8912	194	18	5.1	512	181.5	Yes
95	Jul 18	19:09	52.4163	129.9710	246	19	7.7	631	137.9	Yes
96	Jul 18	20:19	52.4312	130.0267	270	19	8.3	695	68.0	Yes
97	Jul 19	06:04	52.6730	130.6027	144	19	6.3	417	83.2	Yes
98	Jul 19	06:58	52.6405	130.5675	164	19	6.3	494	57.8	Yes
99	Jul 19	08:16	52.5635	130.5922	144	19	7.4	430	103.2	Yes
100	Jul 19	09:27	52.5540	130.4582	181	19	6.4	512	136.6	Yes
101	Jul 19	10:23	52.5700	130.4600	172	19	6.3	507	132.6	Yes
102	Jul 19	12:06	52.6478	130.3343	206	19	5.9	549	392.9	Yes
103	Jul 19	13:19	52.6597	130.2913	239	19	6.3	631	77.8	Yes
104	Jul 19	15:09	52.5640	130.1282	273	19	5.5	750	90.5	Yes
105	Jul 19	16:18	52.5322	130.0865	291	18	5.9	750	93.4	Yes
106	Jul 19	17:33	52.5000	130.0240	268	19	6.1	713	77.9	Yes
107	Jul 19	19:13	52.4870	130.2215	313	20	7.2	713	73.4	Yes
108	Jul 20	06:06	51.7337	129.3350	94	20	6.3	326	294.1	Yes
109	Jul 20	07:05	51.8080	129.3267	133	19	5.7	384	419.9	Yes
110	Jul 20	08:12	51.8585	129.3580	206	20	7.9	549	345.7	Yes
111	Jul 20	09:33	51.8340	129.4532	239	19	5.5	622	459.5	Yes
112	Jul 20	10:47	51.8062	129.4405	198	19	5	549	2,878.5	Yes
113	Jul 20	12:11	51.7560	129.4403	106	19	6.8	366	278.5	Yes
114	Jul 20	13:54	51.6903	129.1402	54	20	6.3	302	241.4	Yes
115	Jul 20	15:12	51.6237	129.1500	54	19	8.1	278	199.8	Yes
116	Jul 20	16:20	51.6218	129.2457	59	19	8.5	274	166.2	Yes
117	Jul 20	17:31	51.5498	129.2925	56	5	7.4	274	78.9	No
118	Jul 20	18:47	51.4853	129.1858	52	19	6.3	284	210.0	Yes
119	Jul 20	20:28	51.4650	128.9292	103	19	5.1	320	1,630.4	Yes
120	Jul 21	06:07	51.5177	128.5827	168	17	6.6	476	826.4	Yes
121	Jul 21	07:46	51.4242	128.5040	197	19	5.5	549	200.0	Yes
122	Jul 21	09:20	51.4047	128.7283	220	20	5.5	594	781.7	Yes
123	Jul 21	10:28	51.4187	128.7788	207	19	6.3	594	453.0	Yes
124	Jul 21	11:38	51.4452	128.7507	190	19	5.1	549	589.3	Yes
125	Jul 21	13:19	51.3322	128.6723	203	19	6.1	549	1,501.9	Yes
126	Jul 21	14:55	51.3035	128.5908	162	14	5.1	465	49.9	No
127	Jul 21	15:45	51.3232	128.5473	138	19	5.9	412	96.3	Yes
128	Jul 21	17:14	51.2907	128.4358	117	3	3.8	366	14.6	No
129	Jul 21	18:34	51.2293	128.4203	173	19	7.4	494	159.7	Yes
130	Jul 21	20:03	51.2150	128.6512	185	19	5.3	503	189.9	Yes

Appendix A continued.

Tow	Date	Time	Latitude	Longitude	Depth (m)	Duration (min)	Speed (km/h)	Warp (m)	Catch (kg)	Usable?
131	Jul 22	06:07	51.4227	129.3262	109	20	5.1	320	864.6	Yes
132	Jul 22	07:30	51.3153	129.3017	259	19	8.5	686	646.8	Yes
133	Jul 22	08:48	51.2927	129.3345	282	19	6.1	732	482.9	Yes
134	Jul 22	10:03	51.3343	129.2693	228	19	9.2	594	418.7	Yes
135	Jul 22	11:25	51.3327	129.1185	249	19	6.4	677	400.9	Yes
136	Jul 22	12:43	51.3012	129.0993	266	19	5.5	732	320.9	Yes
137	Jul 22	13:57	51.2568	129.0910	239	19	5.9	549	7.5	Yes
138	Jul 22	15:05	51.2550	128.9562	211	19	5.7	549	127.7	Yes
139	Jul 22	16:21	51.2112	128.8888	130	19	6.6	366	210.1	Yes
140	Jul 22	17:42	51.2193	128.7253	181	19	5.3	503	286.2	Yes
141	Jul 22	19:35	51.0978	128.5005	142	19	5.7	412	396.9	Yes
142	Jul 24	07:06	51.0533	128.3917	126	20	5.7	348	476.4	Yes
143	Jul 24	08:00	51.0482	128.4508	112	19	5.3	348	256.4	Yes
144	Jul 24	09:22	50.9362	128.4222	58	18	6.6	274	94.4	Yes
145	Jul 24	10:56	50.9145	128.6017	72	19	6.3	274	32.5	Yes
146	Jul 24	12:06	50.8930	128.6358	92	19	6.3	311	146.4	Yes
147	Jul 24	13:23	50.9762	128.6127	70	17	5.9	274	201.8	Yes
148	Jul 24	14:29	51.0340	128.5782	92	19	6.1	329	139.0	Yes
149	Jul 24	15:25	51.0472	128.6435	78	19	6.4	320	267.0	Yes
150	Jul 24	16:36	50.9743	128.7710	61	19	7.4	119	96.5	Yes
151	Jul 24	17:44	50.9985	128.7995	68	19	5.1	320	51.8	Yes
152	Jul 24	18:53	51.0888	128.7723	66	19	4.6	274	159.1	Yes
153	Jul 24	19:49	51.1392	128.7573	91	20	6.8	329	119.5	Yes
154	Jul 25	07:09	51.9397	129.8820	132	15	5.9	384	77.1	Yes
155	Jul 25	09:31	52.0012	129.8950	124	19	6.4	351	501.4	Yes
156	Jul 25	11:06	52.1107	129.9678	152	2	6.4	430	59.2	No
157	Jul 25	11:38	52.1213	129.9548	151	19	5.3	439	32.6	Yes
158	Jul 25	13:12	52.1253	130.1638	273	20	4.8	732	49.3	Yes
159	Jul 25	14:11	52.0700	130.1802	261	19	4.8	722	243.2	Yes
160	Jul 25	15:21	52.0305	130.1168	151	19	5.3	439	375.6	Yes
161	Jul 25	16:23	51.9938	130.1573	165	19	6.3	476	390.2	Yes
162	Jul 25	17:39	51.9300	130.1997	190	16	4.8	503	69.0	Yes
163	Jul 25	18:56	51.9117	130.1535	181	3	5.1	503	0.0	No
164	Jul 26	06:20	52.4755	130.8105	141	19	4.8	412	41.7	Yes
165	Jul 26	07:14	52.4910	130.8167	142	19		439	39.5	Yes
166	Jul 26	08:42	52.5257	130.9658	133	19	5	402	170.2	Yes
167	Jul 26	10:19	52.6205	130.8370	107	19	5.7	320	64.3	Yes
168	Jul 26	11:03	52.6387	130.7868	114	19	5.3	351	134.6	Yes
169	Jul 26	11:46	52.6610	130.7507	118	19	6.1	351	184.4	Yes
170	Jul 26	13:06	52.6492	130.8863	95	19	5.5	320	56.4	Yes
171	Jul 26	14:45	52.6340	131.0898	84	16	5.5	274	23.4	Yes
172	Jul 27	06:23	52.4757	130.6455	112	6	3.5	351	949.9	No
173	Jul 27	08:51	52.4647	130.5098	153	19	4.8	439	0.0	Yes

Appendix A continued.

Tow	Date	Time	Latitude	Longitude	Depth (m)	Duration (min)	Speed (km/h)	Warp (m)	Catch (kg)	Usable?
174	Jul 27	10:14	52.4482	130.4815	185	19	5.3	534	207.3	Yes
175	Jul 27	14:54	52.3630	131.0790	122	20	6.6	351	213.9	Yes
176	Jul 27	16:12	52.3303	131.0907	115	9	6.3	351	102.8	No
177	Jul 27	17:08	52.3297	131.0820	117	19	5.3	351	299.7	Yes
178	Jul 27	18:32	52.2882	130.9352	162	20	7	503	202.5	Yes
179	Jul 27	20:15	52.1118	130.8885	212	15	7.2	585	197.2	Yes
180	Jul 28	07:51	52.2172	130.5168	190	20	5.5	534	140.5	Yes
181	Jul 28	09:01	52.2495	130.5010	195	19	5.3	534	2,228.4	Yes
182	Jul 28	10:51	52.2718	130.4708	223	19	5.1	594	944.2	Yes
183	Jul 28	12:39	52.1763	130.4375	388	19	6.1	841	364.0	Yes
184	Jul 28	14:17	52.1650	130.3242	402	19	6.4	900	260.7	Yes
185	Jul 28	15:30	52.2040	130.3137	387	18	5.5	900	266.5	Yes
186	Jul 28	17:58	52.1445	130.0838	191	19	6.1	534	93.3	Yes
187	Jul 28	19:02	52.2017	130.0842	219	19	5	534	160.6	Yes
188	Jul 28	20:03	52.2373	130.0295	148	19	5.1	439	199.2	Yes
189	Jul 29	06:25	52.4090	130.3900	262	20	5.1	662	106.7	Yes
190	Jul 29	07:35	52.3533	130.3622	283	19	5.1	640	384.7	Yes
191	Jul 29	08:42	52.3370	130.3833	216	19	5.7	534	561.9	Yes
192	Jul 29	10:08	52.3213	130.2988	394	19	4.2	878	352.5	Yes
193	Jul 29	11:25	52.3170	130.2128	373	4	5.5	900	0.0	No
194	Jul 29	14:04	52.2688	130.1078	285	19	6.3	695	85.2	Yes
195	Jul 29	15:04	52.2848	130.0867	262	19	5.1	717	123.4	Yes
196	Jul 29	16:09	52.2847	130.0648	229	19	5.1	549	119.2	Yes
197	Jul 29	17:05	52.3245	130.0763	262	19	5.9	594	208.0	Yes
198	Jul 29	20:31	51.9645	130.2502	250	19	6.3	658	189.0	Yes
199	Jul 30	06:28	51.8380	129.8477	178	19	5.9	534	388.2	Yes
200	Jul 30	07:42	51.8152	129.7697	295	19	5.7	719	171.5	Yes
201	Jul 30	09:02	51.8550	129.7953	202	20	5.1	536	1,362.8	Yes
202	Jul 30	10:19	51.8508	129.6468	271	19	6.8	777	1,548.4	Yes
203	Jul 30	11:32	51.8342	129.5855	275	18	6.3	717	156.1	Yes
204	Jul 30	12:44	51.7977	129.6627	290	18	5.7	777	230.5	Yes
205	Jul 30	13:47	51.7752	129.7148	306	19	5.5	732	301.7	Yes
206	Jul 30	14:49	51.7635	129.7797	329	20	5.1	777	466.5	Yes
207	Jul 30	16:05	51.7625	129.8840	330	19	4.6	777	302.6	Yes
208	Jul 30	17:15	51.7755	129.9425	279	20	5.9	717	206.3	Yes
209	Jul 30	18:58	51.7297	129.7160	294	18	3.8	717	356.2	Yes
210	Aug 1	10:39	50.9758	129.3533	183	19	6.3	534	828.6	Yes
211	Aug 1	11:36	51.0172	129.3413	188	19	2.5	534	773.3	Yes
212	Aug 1	12:40	51.0152	129.3530	191	18	5.7	534	344.6	Yes
213	Aug 1	14:24	51.0317	129.2922	176	19	5.7	503	311.1	Yes
214	Aug 1	15:28	51.0178	129.2388	159	17	5.9	457	418.2	Yes
215	Aug 1	18:08	51.0513	128.9292	90	19	5.5	320	320.0	Yes

Appendix A continued.

Tow	Date	Time	Latitude	Longitude	Depth (m)	Duration (min)	Speed (km/h)	Warp (m)	Catch (kg)	Usable?
216	Aug 1	19:36	51.1393	129.0250	133	19	5.7	384	131.1	Yes
217	Aug 2	07:15	51.7090	129.7897	321	19	5.1	777	247.8	Yes
218	Aug 2	08:18	51.7185	129.8170	333	19	5.5	777	253.0	Yes
219	Aug 2	09:44	51.6900	129.9430	360	19	5.3	823	287.8	Yes
220	Aug 2	10:46	51.6703	129.9842	363	19	5.3	823	257.5	Yes
221	Aug 2	12:19	51.7032	130.0845	324	19	6.1	777	253.1	Yes
222	Aug 2	14:46	51.6255	130.1092	375	16	5.7	823	465.0	Yes
223	Aug 2	15:51	51.6173	130.1030	450	15	5.3	900	269.0	Yes
224	Aug 2	17:03	51.6072	130.0673	377	7	5.1	823	123.4	No
225	Aug 2	18:03	51.6142	130.0007	331	20	5.9	777	240.4	Yes
226	Aug 2	20:05	51.6503	129.7075	167	15	6.1	457	349.1	Yes
227	Aug 3	06:52	52.0580	130.8263	241	19	6.1	640	232.7	Yes
228	Aug 3	08:40	51.9757	130.6127	291	19	5.1	750	121.4	Yes
229	Aug 3	10:12	51.8662	130.6403	355	19	5.7	869	721.1	Yes
230	Aug 3	11:28	51.8333	130.6448	313	19	5.5	823	2,223.7	Yes
231	Aug 3	14:05	51.8470	130.5583	278	19	6.1	717	382.3	Yes
232	Aug 3	15:14	51.8293	130.5592	285	15	4.8	717	0.0	No
233	Aug 4	06:56	51.8320	130.7672	266	16	6.4	717	696.2	Yes
234	Aug 4	09:23	51.8695	130.4605	295	19	5.3	717	406.2	Yes
235	Aug 4	11:05	51.8950	130.3687	232	19	7	549	511.6	Yes
236	Aug 4	14:00	51.6797	130.4105	299	19	5.7	717	540.0	Yes
237	Aug 4	16:59	51.6032	129.9765	260	19	6.6	717	1,732.2	Yes
238	Aug 4	19:41	51.4977	129.6823	155	19	6.4	457	51.3	Yes
239	Aug 5	06:34	51.4993	129.6470	149	17	6.4	421	117.6	Yes
240	Aug 5	07:26	51.4735	129.6422	153	19	6.3		434.1	Yes
241	Aug 5	10:42	51.3210	129.7090	228	19	6.3	534	647.4	Yes
242	Aug 5	12:54	51.2428	129.9795	334	19	5.9	777	674.3	Yes
243	Aug 5	14:54	51.1507	129.7657	463	16	5.3	1,006	400.8	Yes
244	Aug 5	17:15	51.1208	129.6388	283	15		717	781.4	Yes
245	Aug 5	19:02	51.0538	129.7538	498	5		988	40.7	No
246	Aug 6	06:35	51.1955	129.1067	177	19	5.9	534	221.6	Yes
247	Aug 6	07:52	51.1968	129.2712	295	19	5.3	717	437.2	Yes
248	Aug 6	09:49	51.2238	129.5352	290	19	5.1	721	551.2	Yes
249	Aug 6	11:06	51.1383	129.5370	288	19	6.1	717	517.2	Yes
250	Aug 6	12:29	51.0887	129.4130	249	16	6.4	594	738.0	Yes

APPENDIX B: CATCH BY TOW

Species	1	2	3	4	5	6	7	8	9	10
Aleutian skate										
Arrowtooth flounder	156.79	171.58	69.25	3.86	3.61	1.51	3.00	9.54	11.80	2.12
Big skate										
Bigmouth sculpin										
Black eelpout										
Blackbelly eelpout	0.24	8.04	0.01					0.58	0.04	
Blackfin sculpin				0.19					0.06	0.39
Bocaccio										
Canary rockfish							167.19		2.97	
Curlfin sole	0.38									
Darkblotched rockfish										
Dover sole	9.69	19.82	3.55	0.44					0.35	
Dusky rockfish										
English sole										
Eulachon								3.19	0.61	
Flathead sole	2.22	10.40	0.91				0.02	0.16	0.05	
Greenstriped rockfish			0.68	3.82	2.55	6.42	2.06		2.02	0.89
Lingcod					4.42				11.57	12.41
Longnose skate		2.29			3.61					
Longspine thornyhead										
Pacific cod	1.62	15.44	1.37	12.03	3.88	12.62			0.80	1.41
Pacific hake										
Pacific halibut					6.92					
Pacific ocean perch	0.68		0.11	88.12	5.15	0.22			9.95	1.11
Pacific sand lance										
Pacific sanddab										
Petrale sole					0.28					
Quillback rockfish		1.02								
Redbanded rockfish				3.46			24.44	1.23	61.72	6.55
Redstripe rockfish	1.04		65.98	3.90	0.28	5.10	239.57		93.10	18.57
Rex sole	27.42	15.41	18.64	2.43	0.94	2.20	6.74	0.12		
Rosethorn rockfish						0.46				1.66
Rougheye rockfish								0.01	1.48	0.21
Sablefish	4.06	0.68	1.71	5.26			1.78		1.33	
Sandpaper skate										
Sharpchin rockfish	0.62				0.01		2.88			2.01
Shortraker rockfish										
Shortspine thornyhead									0.53	
Silvergray rockfish	0.84		0.99	16.44		8.48	45.26		5.01	6.73
Slender sole	1.72	2.46	0.57				0.56	0.60	0.08	
Southern rock sole										
Spiny dogfish	11.98	0.78		1.05		1.00	0.88	0.59	1.26	
Splitnose rockfish								0.16		
Spotted ratfish	3.38	28.90	1.88	0.74	12.79	3.14	0.96	2.85	1.77	
Walleye pollock	70.73	17.72	2.80		0.20	0.36	0.68			1.78
Widow rockfish										
Wolf eel										
Yelloweye rockfish				3.56		5.70	12.98			15.24
Yellowmouth rockfish						0.84	1.72			
Yellowtail rockfish			14.19				46.44			
Other	0.24	0.83	1.35	8.60	2.71	5.65	3.80	5.09	2.37	12.64
Total	293.65	295.37	183.99	153.90	47.35	53.70	560.96	24.12	208.87	81.72

Appendix B continued.

Species	11	12	13	14	15	16	17	18	19	20
Aleutian skate										
Arrowtooth flounder	7.52	8.42	15.52	18.46	112.26	310.27	6.54	16.17	5.22	15.93
Big skate										
Bigmouth sculpin										
Black eelpout										
Blackbelly eelpout	1.37	2.75								
Blackfin sculpin			0.23							
Bocaccio										
Canary rockfish				2.39			9.00	2.85		
Curlfin sole										
Darkblotched rockfish										
Dover sole					0.82	0.68				
Dusky rockfish										
English sole					0.20	2.06				
Eulachon	20.11	21.74	0.04	0.17						
Flathead sole	0.01	0.55								
Greenstriped rockfish							1.48	1.24	0.77	0.14
Lingcod				13.13			5.31		16.49	13.00
Longnose skate	11.48	7.87	18.92							
Longspine thornyhead										
Pacific cod			2.00	4.03	9.18	16.44	11.39	8.30	2.18	4.92
Pacific hake										
Pacific halibut										
Pacific ocean perch	1.26		0.18	0.31			1.06	2.31	2.57	0.78
Pacific sand lance										
Pacific sanddab					0.26					
Petrale sole				3.21		3.30		1.45		0.48
Quillback rockfish					10.72					
Redbanded rockfish			16.40	3.85			37.84			
Redstripe rockfish		0.59					9.56	4.15	15.64	
Rex sole	0.02			2.65	0.44	9.48	0.87	0.76	0.86	1.16
Rosethorn rockfish										
Rougheye rockfish										
Sablefish	0.59		1.61	3.24					0.96	
Sandpaper skate										
Sharpchin rockfish			0.55					0.03	0.34	0.36
Shortraker rockfish										
Shortspine thornyhead										
Silvergray rockfish				3.34		7.13	33.36	23.94	24.16	22.09
Slender sole	0.05	0.30	0.11	0.32	0.14					
Southern rock sole										
Spiny dogfish	1.28	0.86	1.72	5.73	57.42	3.16	11.67	1.53	4.37	9.02
Splitnose rockfish	13.76	0.41	0.09							
Spotted ratfish	2.56	0.55	2.36		18.74	2.42	0.69	0.64		0.12
Walleye pollock				3.53	10.78		0.73	0.40	1.25	1.24
Widow rockfish										
Wolf eel										
Yelloweye rockfish							0.93	2.86		2.77
Yellowmouth rockfish							0.25	0.88		
Yellowtail rockfish			2.54			19.65	3.58		4.21	
Other	4.77	3.80	12.42	1.72		11.76	8.93	1.85	5.84	1.40
Total	64.78	47.84	74.69	66.08	220.96	386.35	143.19	69.36	84.86	73.41

Appendix B continued.

Species	21	22	23	24	25	26	27	28	29	30
Aleutian skate										
Arrowtooth flounder	62.89	18.46	0.98	1.11	11.03	9.48	12.92	15.14	17.25	12.50
Big skate										
Bigmouth sculpin			3.38							
Black eelpout								0.13		
Blackbelly eelpout				0.06				0.13		
Blackfin sculpin			0.24		0.42	0.14		0.08		
Bocaccio		4.97		4.54						
Canary rockfish						1.36				
Curlfin sole										
Darkblotched rockfish	0.05									
Dover sole						0.20	29.26	3.22	8.76	2.10
Dusky rockfish										
English sole	0.29									
Eulachon							0.47	1.72	0.04	0.54
Flathead sole										4.86
Greenstriped rockfish		2.38	2.02	1.05	1.02	2.32				
Lingcod	8.21					2.66				
Longnose skate										
Longspine thornyhead										
Pacific cod	0.55	23.76	2.87		4.59	11.74				0.95
Pacific hake							2.85	4.14	13.54	0.86
Pacific halibut					10.82	5.05				
Pacific ocean perch	0.25	20.61	7.22	1.11	0.90	2.36	5.57	2.69	22.30	21.82
Pacific sand lance										
Pacific sanddab										
Petrale sole						3.02				
Quillback rockfish										
Redbanded rockfish		0.82	0.18	16.62			13.36	13.59	13.10	2.07
Redstripe rockfish				0.87		0.96				
Rex sole	7.46	1.16	4.87	2.53	4.10	5.47	9.38	3.75	5.20	4.69
Rosethorn rockfish										
Rougheye rockfish								6.29	0.98	0.14
Sablefish	0.97	0.73	0.62				2.09		4.00	2.59
Sandpaper skate							0.57			
Sharpchin rockfish	0.12	0.84	0.35	0.56	0.03	0.45		3.56		
Shortraker rockfish										
Shortspine thornyhead							1.37	13.19	4.05	0.51
Silvergray rockfish	11.24	93.00	14.98	19.10	26.32	1.33		4.82	1.59	1.78
Slender sole		0.28					0.74	0.07	1.04	0.59
Southern rock sole		0.72								
Spiny dogfish	6.37	5.39				4.64		1.06	3.92	13.10
Splitnose rockfish										
Spotted ratfish		0.96	0.30	0.81		0.47	0.15		0.47	0.24
Walleye pollock	0.34	0.34	1.12		1.01					
Widow rockfish										
Wolf eel										
Yelloweye rockfish										
Yellowmouth rockfish	0.12	2.09		0.08		1.94				
Yellowtail rockfish		1.76		1.67	3.58	10.84				
Other	0.99	10.67	7.12	8.21	2.38	4.60	11.70	27.34	2.02	1.45
Total	99.85	188.94	46.25	58.32	66.20	69.03	90.43	100.92	98.26	70.79

Appendix B continued.

Species	31	32	33	34	35	36	37	38	39	40
Aleutian skate										
Arrowtooth flounder	9.08	3.99	3.73	18.82	24.42	3.92	7.13	1227.25	165.47	47.23
Big skate										
Bigmouth sculpin										
Black eelpout										
Blackbelly eelpout					0.23					0.10
Blackfin sculpin	0.11									
Bocaccio										
Canary rockfish							32.63	8.03		
Curlfin sole										
Darkblotched rockfish									2.26	
Dover sole		0.40	0.72	1.72				8.13	4.08	5.21
Dusky rockfish										
English sole										
Eulachon	6.18	0.19		0.30	0.44					
Flathead sole	0.49		1.08	0.65	3.74			1.03	0.56	0.41
Greenstriped rockfish							1.12	0.78		
Lingcod		6.63					3.17			
Longnose skate			13.53		11.81				5.41	8.58
Longspine thornyhead										
Pacific cod				3.41	1.96		2.97	3.27		
Pacific hake	1.02									
Pacific halibut					5.41		4.02			
Pacific ocean perch	206.25	6.56	17.64	9.79	8.82		0.11	0.80	1.18	0.35
Pacific sand lance										
Pacific sanddab										
Petrale sole			0.56		2.89	4.41	2.86	1.73		
Quillback rockfish										
Redbanded rockfish	19.68	30.03	5.54	7.83	12.17			10.29	5.02	
Redstripe rockfish										
Rex sole	2.80	4.42	3.22	8.71	4.97	1.08	0.52	3.13	0.84	0.03
Rosethorn rockfish	0.78									
Rougheye rockfish		0.79							0.14	1.86
Sablefish	4.33	3.05	5.06	2.99	4.93			1.64	2.92	0.92
Sandpaper skate										
Sharpchin rockfish	6.94	0.40				0.05	0.35		0.16	
Shortraker rockfish										
Shortspine thornyhead	1.07									
Silvergray rockfish	21.58	15.60	57.22	11.83	32.86	6.21	32.06	1.04		
Slender sole	0.27		0.09	0.36	0.69				0.34	0.13
Southern rock sole										
Spiny dogfish	15.00	26.26	12.60		6.97		14.83	1.28	1.80	1.71
Splitnose rockfish		0.15	0.30							
Spotted ratfish		0.09	0.54	2.74	0.70	0.20	14.48	4.11	1.76	4.13
Walleye pollock		2.43	3.59	6.50		0.54			0.20	
Widow rockfish										
Wolf eel										
Yelloweye rockfish								3.00		
Yellowmouth rockfish										
Yellowtail rockfish										4.74
Other	6.35	0.91	0.28		1.85	5.45	8.95	1.60	5.80	1.67
Total	301.93	101.90	125.70	75.65	124.86	21.86	125.20	1277.11	197.94	77.07

Appendix B continued.

Species	41	42	43	44	45	46	47	48	49	50
Aleutian skate										
Arrowtooth flounder	31.20	12.16	244.53	806.00	270.13	8.19	111.69	223.08	174.87	79.80
Big skate										
Bigmouth sculpin										
Black eelpout										
Blackbelly eelpout					0.18		0.18	0.41	0.07	
Blackfin sculpin										
Bocaccio		3.76								
Canary rockfish				40.28						
Curfin sole										
Darkblotched rockfish		1.38						0.24		
Dover sole	3.74			2.34	2.22	0.88	4.38	12.10	1.87	0.40
Dusky rockfish										
English sole			0.20	13.94					14.40	7.56
Eulachon										
Flathead sole	0.68	1.16			6.02	0.25	2.57	1.46	3.24	2.96
Greenstriped rockfish						1.25				0.44
Lingcod			2.62	30.67			5.36			13.37
Longnose skate						8.75		3.70		
Longspine thornyhead										
Pacific cod			5.16	10.42		1.93		1.14	0.25	14.68
Pacific hake		5.72	0.78							
Pacific halibut						2.42			16.86	
Pacific ocean perch	2.38	0.80				0.64	0.30	0.22	0.04	0.32
Pacific sand lance										
Pacific sanddab			0.22	0.74						
Petrals sole			0.60	5.96		6.16			1.80	
Quillback rockfish										1.99
Redbanded rockfish	0.34	7.16				98.68	8.58			
Redstripe rockfish						0.28				5.36
Rex sole		5.12	0.58	3.42	4.30	0.22	1.58	0.30	9.69	6.04
Rosethorn rockfish										
Rougheye rockfish	5.78	2.84								
Sablefish	3.68	8.24			5.02		0.56	1.14	0.42	
Sandpaper skate										
Sharpchin rockfish					0.06	0.54				
Shortraker rockfish										
Shortspine thornyhead	0.28									
Silvergray rockfish	8.38	57.54		6.40	8.46	18.38	4.94			20.41
Slender sole	0.28						0.54	0.20	0.23	0.38
Southern rock sole										
Spiny dogfish	1.40		1.84	5.90	4.04			2.28	3.10	
Splitnose rockfish	0.26									
Spotted ratfish	5.10	0.88	27.84	11.74	5.50	1.06		2.72	8.31	4.58
Walleye pollock									1.42	1.30
Widow rockfish										
Wolf eel										
Yelloweye rockfish						0.73	11.56			17.38
Yellowmouth rockfish										0.14
Yellowtail rockfish	78.30	3.62					10.34			10.47
Other	5.28	0.86		2.04	0.36	0.04	1.31	6.23	0.91	4.62
Total	147.08	111.24	284.37	939.85	306.29	150.40	163.89	255.22	237.48	192.20

Appendix B continued.

Species	51	52	53	54	55	56	57	58	59	60
Aleutian skate										
Arrowtooth flounder	68.38		173.66	173.90	41.52	74.44	48.16	116.40	633.74	567.72
Big skate										4.92
Bigmouth sculpin										
Black eelpout										
Blackbelly eelpout					0.42	1.34	0.86	0.20	0.76	0.23
Blackfin sculpin									0.12	
Bocaccio										
Canary rockfish									0.56	
Curlfin sole		0.33								
Darkblotched rockfish										
Dover sole			2.40	7.14	5.60	5.56	5.26	6.90	9.68	22.45
Dusky rockfish										
English sole	8.64		6.20	5.18		1.08				2.85
Eulachon	0.06				0.58	2.44	0.90			
Flathead sole	1.90	0.38	0.86	8.54	8.30	10.04	18.96	14.82	6.22	8.07
Greenstriped rockfish					0.52			1.50	1.60	
Lingcod			1.74						9.46	
Longnose skate						1.84			5.30	
Longspine thornyhead										
Pacific cod					4.78		0.48	4.06	6.32	1.71
Pacific hake							1.32	1.24	0.84	5.30
Pacific halibut	5.79		8.62		5.16	8.54			7.96	
Pacific ocean perch	0.10			0.10		0.10	279.12	10.14		
Pacific sand lance										
Pacific sanddab		1.96	0.56							
Petrals sole	0.48	1.48	3.76	1.16	0.54		1.98		1.90	1.38
Quillback rockfish										
Redbanded rockfish				3.86	3.04			1.32	12.76	2.80
Redstripe rockfish				9.05	1.08		1.28		3.14	
Rex sole	7.20		13.16	5.84	2.30	0.76	5.74	6.82	2.96	3.42
Rosethorn rockfish										
Rougheye rockfish										1.75
Sablefish	0.36	0.50			2.62	4.10	0.50	10.22	1.24	5.96
Sandpaper skate										
Sharpchin rockfish				0.16	0.48			0.48		
Shortraker rockfish										
Shortspine thornyhead										
Silvergray rockfish	4.26		3.42	23.18	14.52	1.06	1.94	6.52	26.34	1.86
Slender sole				0.40	0.34	0.22		0.38	0.38	0.38
Southern rock sole		4.03								0.66
Spiny dogfish	4.08	4.54	8.56	4.82	2.22	3.52	5.40	8.16		4.25
Splitnose rockfish										
Spotted ratfish	7.92	0.41	2.54	2.68	3.16	2.48	2.10	1.42	1.72	5.15
Walleye pollock	1.30		0.24	0.34	0.32		0.26		0.68	
Widow rockfish										
Wolf eel										
Yelloweye rockfish							4.68	2.72	17.34	
Yellowmouth rockfish										
Yellowtail rockfish	3.02			158.68	89.52	2.34	47.16			
Other	0.07	0.06	0.20	0.27		1.84	0.30	3.54	1.08	
Total	113.56	13.69	225.92	405.30	187.02	121.70	426.40	196.84	752.10	640.86

Appendix B continued.

Species	61	62	63	64	65	66	67	68	69	70
Aleutian skate										6.92
Arrowtooth flounder	125.65	62.86	379.20	6.99	181.58	127.39	444.20	67.02	55.75	68.86
Big skate										
Bigmouth sculpin										
Black eelpout										
Blackbelly eelpout		1.00	1.12	0.05	4.48	1.28	14.06	22.79		2.22
Blackfin sculpin										
Bocaccio					4.64					
Canary rockfish					1.46					
Curlfin sole										
Darkblotched rockfish										
Dover sole	29.42	36.77	24.46	7.62	51.12	9.84	40.04	9.45	1.12	5.88
Dusky rockfish										
English sole	0.88		0.92		0.34		0.62	0.27	5.06	
Eulachon		5.46				0.09		12.32		6.20
Flathead sole	7.78	2.10	8.94	0.28	7.36	2.20	73.58	19.31	1.09	2.58
Greenstriped rockfish	1.88								3.82	
Lingcod										
Longnose skate	5.89					6.45	28.41	1.21		
Longspine thornyhead										
Pacific cod	2.56		1.40		3.44	6.00			17.62	
Pacific hake		10.48						0.13		
Pacific halibut		8.73	3.24						6.22	
Pacific ocean perch	44.76	2.65				1.64	1.68	0.03	0.04	0.22
Pacific sand lance										
Pacific sanddab										
Petrable sole										
Quillback rockfish									1.55	
Redbanded rockfish	5.44				0.66					4.90
Redstripe rockfish	0.26		19.46			0.46			79.34	
Rex sole	11.56	1.48	44.64	4.44	88.52	72.80	3.80	2.67	4.47	
Rosethorn rockfish										
Rougheye rockfish							1.10	0.67		0.14
Sablefish	0.56		26.12		25.52	6.09		2.32	0.47	
Sandpaper skate										
Sharpchin rockfish				0.63					0.05	
Shortraker rockfish										
Shortspine thornyhead		6.97								2.02
Silvergray rockfish	7.21		2.16						4.17	2.16
Slender sole	0.84	1.08	1.76	0.25	2.02	0.70	4.56	0.44		0.38
Southern rock sole										
Spiny dogfish		1.46	2.56	0.92	9.36		4.38	1.94	2.71	
Splitnose rockfish										0.56
Spotted ratfish	2.18	1.50	4.00	0.45	5.16	1.01	27.33	3.33	0.74	0.54
Walleye pollock			67.96	1.88	68.76	24.19	18.90	8.81		
Widow rockfish										
Wolf eel										
Yelloweye rockfish			6.12						4.44	
Yellowmouth rockfish										0.40
Yellowtail rockfish	1.20				2.00				1.83	
Other	0.22	3.30	0.56	1.00	0.36		2.39	2.20	3.90	4.12
Total	248.29	145.84	594.62	24.51	456.78	260.14	665.05	154.91	194.39	108.10

Appendix B continued.

Species	71	72	73	74	75	76	77	78	79	80
Aleutian skate										
Arrowtooth flounder	197.01	146.02						9.89	64.32	46.08
Big skate			2.78							
Bigmouth sculpin										
Black eelpout										
Blackbelly eelpout	1.85	0.11								
Blackfin sculpin										
Bocaccio										
Canary rockfish					0.02			464.67	29.80	315.41
Curfin sole			1.30	0.70						
Darkblotched rockfish										
Dover sole	55.33	75.97								
Dusky rockfish										
English sole		0.29	0.24					0.64		0.85
Eulachon	2.28	2.19								
Flathead sole	1.07	8.86								
Greenstriped rockfish										
Lingcod						6.23	6.42		58.76	
Longnose skate	2.77									8.17
Longspine thornyhead										
Pacific cod										
Pacific hake	8.56	9.14								
Pacific halibut		6.76	7.03	11.27	28.31	17.41			23.44	
Pacific ocean perch	0.35	14.94								
Pacific sand lance			0.32	1.08	42.78	2.20	0.10		4.80	
Pacific sanddab			0.96	0.55	0.82		0.86	3.69		
Petrale sole			1.68	3.33	3.70			0.36	16.74	7.14
Quillback rockfish						8.54	4.24		4.16	
Redbanded rockfish	1.28	41.74	4.98							
Redstripe rockfish							2.67			
Rex sole	1.72	2.28						0.26		0.58
Rosethorn rockfish										
Rougheye rockfish		1.81								
Sablefish		3.46								
Sandpaper skate										
Sharpchin rockfish										
Shortraker rockfish										
Shortspine thornyhead	12.55	11.12								
Silvergray rockfish								58.16		130.47
Slender sole	0.62	0.40								
Southern rock sole			46.22	8.82	62.59	0.99	68.80	0.85	32.64	
Spiny dogfish		9.45	48.40	16.86	106.47	41.75	12.50	7.33	388.68	81.80
Splitnose rockfish										
Spotted ratfish	4.37	3.36	0.40		1.20	104.48	12.76	2.53	32.70	3.20
Walleye pollock										
Widow rockfish							0.67			
Wolf eel										
Yelloweye rockfish							5.12	11.54		
Yellowmouth rockfish										
Yellowtail rockfish										
Other	6.83	1.55	2.34			3.00	3.10	10.95		2.94
Total	296.59	339.45	116.65	42.61	245.89	184.60	117.24	570.87	656.04	596.64

Appendix B continued.

Species	81	82	83	84	85	86	87	88	89	90
Aleutian skate										
Arrowtooth flounder	13.75	24.70	19.78	30.02	1.10	19.38	11.82	8.56	5.54	3.82
Big skate										
Bigmouth sculpin										
Black eelpout										
Blackbelly eelpout										
Blackfin sculpin										
Bocaccio										
Canary rockfish	40.59	22.35	1.84	37.00	177.76	14.78				31.74
Curlfin sole			1.99							
Darkblotched rockfish										
Dover sole	0.75					0.62				
Dusky rockfish										
English sole	2.06	8.62	2.06	14.80						
Eulachon						0.26	9.02	3.87		
Flathead sole										
Greenstriped rockfish					0.44	2.76				
Lingcod					8.24					
Longnose skate						5.22				
Longspine thornyhead										
Pacific cod				0.48	3.04				1.35	1.92
Pacific hake							4.50			
Pacific halibut		8.58	25.90		8.90				7.19	5.40
Pacific ocean perch						7.62	0.30		0.08	
Pacific sand lance										
Pacific sanddab		6.13	0.30							
Petrale sole	0.63	1.26	3.68	1.68		29.40				1.62
Quillback rockfish										
Redbanded rockfish						174.91	18.06	1.49		
Redstripe rockfish										
Rex sole	0.96	0.20		0.56		0.66			3.16	
Rosethorn rockfish										
Rougheye rockfish							0.20			
Sablefish		0.70						0.43		
Sandpaper skate										
Sharpchin rockfish										
Shortraker rockfish										
Shortspine thornyhead							0.52			
Silvergray rockfish	11.40	21.39	21.92		71.70	5.02			40.97	199.91
Slender sole										
Southern rock sole		1.79	5.92		0.40					0.72
Spiny dogfish	25.04	170.33	575.92	8.44			13.60	1.19	2.68	5.70
Splitnose rockfish							0.10			
Spotted ratfish	3.00	8.36	2.34	0.60	2.88	0.84	0.94			1.00
Walleye pollock					0.24				1.29	1.52
Widow rockfish									4.23	
Wolf eel										
Yelloweye rockfish										
Yellowmouth rockfish							0.48			
Yellowtail rockfish				2.54	35.62	3.38			16.53	3.32
Other	2.28	6.34	1.57	10.24		0.18	6.43	1.40		
Total	100.46	280.75	663.22	106.36	310.32	265.03	65.97	16.94	83.02	256.67

Appendix B continued.

Species	91	92	93	94	95	96	97	98	99	100
Aleutian skate										
Arrowtooth flounder	0.84	1.71	0.86	1.86	8.87	15.24	3.04	6.30	4.56	14.41
Big skate										
Bigmouth sculpin										
Black eelpout										
Blackbelly eelpout					0.11		0.44	0.39	0.10	
Blackfin sculpin										0.19
Bocaccio										
Canary rockfish	630.96	33.76	5.16				4.61			
Curlfin sole										
Darkblotched rockfish										
Dover sole					5.37	20.41	3.66			0.25
Dusky rockfish										
English sole			0.32						13.64	
Eulachon					2.08			0.39		
Flathead sole					1.88	1.56	6.16	2.77	1.88	
Greenstriped rockfish									0.41	0.43
Lingcod		11.18					2.70			
Longnose skate							8.66			
Longspine thornyhead										
Pacific cod			3.28	14.20	0.95					
Pacific hake					5.73	6.59				
Pacific halibut		8.72	13.75				8.18			
Pacific ocean perch			0.60	1.54	15.89	1.85	0.02	0.19		8.04
Pacific sand lance		0.23								
Pacific sanddab		0.25								
Petrale sole	0.96	7.72					2.10		3.20	0.69
Quillback rockfish										
Redbanded rockfish					8.56	5.29		0.72		7.68
Redstripe rockfish										
Rex sole			0.66	0.94	8.94	10.76	24.34	19.31	26.48	15.18
Rosethorn rockfish										
Rougheye rockfish										
Sablefish				1.24	2.31	2.15	1.90	0.88		5.56
Sandpaper skate										
Sharpchin rockfish										
Shortraker rockfish										
Shortspine thornyhead					0.47	1.04		0.49		
Silvergray rockfish	22.30	19.48	159.25	152.29	19.36		9.79	15.28	39.49	70.68
Slender sole				0.30	0.35	1.40	0.36	0.51	0.04	0.37
Southern rock sole										
Spiny dogfish	6.02	0.88	5.90	4.58	0.61		4.31	6.16	13.19	2.39
Splitnose rockfish						0.10				
Spotted ratfish	11.44	6.68	0.98	0.58	0.36	0.37	0.36			0.09
Walleye pollock			0.48	0.58	54.48				0.12	2.63
Widow rockfish										
Wolf eel										
Yelloweye rockfish										
Yellowmouth rockfish										
Yellowtail rockfish				3.34						
Other	0.14		0.90		1.59	1.25	2.58	4.43	0.06	8.07
Total	672.66	90.61	192.14	181.45	137.91	68.01	83.21	57.82	103.17	136.56

Appendix B continued.

Species	101	102	103	104	105	106	107	108	109	110
Aleutian skate										
Arrowtooth flounder	3.07	35.14	28.88	5.54	22.66	7.10	2.47	14.68	367.17	65.73
Big skate								3.16		
Bigmouth sculpin										
Black eelpout					0.10		0.31			
Blackbelly eelpout										
Blackfin sculpin										
Bocaccio										
Canary rockfish									13.78	1.29
Curlfin sole								5.74		
Darkblotched rockfish						0.31				
Dover sole	0.81		0.90	1.25		3.26	1.83		0.70	0.70
Dusky rockfish										
English sole								2.18		32.75
Eulachon	0.26	4.54	1.98	0.52		2.31				
Flathead sole	0.65	1.84								
Greenstriped rockfish		0.64								
Lingcod									4.21	
Longnose skate		1.96				14.94		4.91		
Longspine thornyhead										
Pacific cod									0.40	
Pacific hake			12.00	2.61	32.81	11.99	15.09			
Pacific halibut								9.45	8.14	
Pacific ocean perch	2.95	104.52	5.65	24.57	13.76	3.33	30.42			65.12
Pacific sand lance								0.16		
Pacific sanddab										
Petrale sole			0.48					1.74	6.72	4.16
Quillback rockfish										
Redbanded rockfish	4.37	45.50	5.60	3.41	3.72	16.15	1.99			20.24
Redstripe rockfish										
Rex sole	28.88	4.88	1.52	14.49	1.06	2.80		0.06	0.17	2.12
Rosethorn rockfish					0.76					
Rougheye rockfish		0.14	1.26	2.02	0.98	5.35	3.28			
Sablefish	2.42	1.66	1.14		4.12	1.32	5.69			44.72
Sandpaper skate							0.34			
Sharpchin rockfish		0.24								0.34
Shortraker rockfish										
Shortspine thornyhead		0.56	0.40	13.45	6.00	2.09	6.87			
Silvergray rockfish	69.96	163.99	11.36						6.44	2.29
Slender sole					0.14	0.71				0.22
Southern rock sole								221.48	4.13	
Spiny dogfish	11.74	1.46	4.52	5.40	1.28	5.09	0.85	27.98	6.82	14.26
Splitnose rockfish		4.56				0.22				
Spotted ratfish	0.60								1.26	0.40
Walleye pollock	3.82	9.06								
Widow rockfish										
Wolf eel								2.52		
Yelloweye rockfish										
Yellowmouth rockfish										91.35
Yellowtail rockfish										
Other	3.08	12.18	2.06	17.24	6.00	0.91	4.26			
Total	132.61	392.87	77.75	90.50	93.39	77.88	73.40	294.06	419.94	345.69

Appendix B continued.

Species	111	112	113	114	115	116	117	118	119	120
Aleutian skate										
Arrowtooth flounder	20.64	14.90							136.96	258.50
Big skate			2.40					12.06	29.60	
Bigmouth sculpin										
Black eelpout										
Blackbelly eelpout	0.02									0.28
Blackfin sculpin										
Bocaccio										
Canary rockfish	1.92									
Curlfin sole										
Darkblotched rockfish										
Dover sole	2.98	0.90								27.86
Dusky rockfish										
English sole	0.94	10.60							13.58	
Eulachon										
Flathead sole										7.98
Greenstriped rockfish										5.50
Lingcod		7.24	25.20	5.46		1.96	3.48		32.76	4.08
Longnose skate		6.72								56.69
Longspine thornyhead										
Pacific cod									0.58	2.74
Pacific hake	9.52	121.70								
Pacific halibut		4.30	224.50	32.91	18.84	4.75		22.74		5.61
Pacific ocean perch	379.49	1643.97								262.72
Pacific sand lance			19.14	2.40	0.05		0.08	0.60		
Pacific sanddab				0.36						
Petrale sole		0.76	4.48						4.86	
Quillback rockfish								1.52		
Redbanded rockfish	15.52	7.66								75.72
Redstripe rockfish								0.02		58.19
Rex sole	0.56	2.22							0.32	10.84
Rosethorn rockfish										
Rougheye rockfish										
Sablefish	5.96	12.12								10.50
Sandpaper skate										
Sharpchin rockfish										11.66
Shortraker rockfish										
Shortspine thornyhead	4.42	0.68								7.30
Silvergray rockfish		4.12								7.16
Slender sole										0.44
Southern rock sole			2.62	0.48	3.14	6.46	1.37	45.94		
Spiny dogfish	6.20	1.24		199.80	116.01	145.16	9.69	108.52	43.46	2.34
Splitnose rockfish										
Spotted ratfish					60.80	3.44	60.55	18.20	4.48	1.10
Walleye pollock	1.08									
Widow rockfish		2.50					0.35		2.38	
Wolf eel						4.34				
Yelloweye rockfish										6.57
Yellowmouth rockfish	9.36	1012.23								2.28
Yellowtail rockfish		24.52							1361.44	
Other	0.92	0.12	0.18		1.00	0.10	3.34	0.44		0.32
Total	459.53	2878.50	278.52	241.41	199.84	166.21	78.86	210.04	1630.42	826.38

Appendix B continued.

Species	121	122	123	124	125	126	127	128	129	130
Aleutian skate		6.69								
Arrowtooth flounder	63.66	57.50	35.87	118.82	61.16	4.30	5.54	0.99	55.31	107.76
Big skate										
Bigmouth sculpin									4.60	
Black eelpout										
Blackbelly eelpout	0.66			13.96					1.27	0.37
Blackfin sculpin					0.07	0.44	0.03			
Bocaccio					2.92					
Canary rockfish			2.54				34.21	4.62		
Curfin sole										
Darkblotched rockfish										
Dover sole	35.44	28.36	3.44	6.74	6.76				37.36	4.86
Dusky rockfish										
English sole									0.23	7.84
Eulachon	0.88								6.17	
Flathead sole		0.54	0.36	7.10	1.66				9.13	18.45
Greenstriped rockfish	0.39		0.70		13.75	0.52	1.38			
Lingcod							6.99			
Longnose skate	0.73	2.87	6.09		9.10					
Longspine thornyhead										
Pacific cod			1.45		131.88	1.94	4.82			2.18
Pacific hake	2.08	1.26			1.01					
Pacific halibut										
Pacific ocean perch	75.52	512.06	302.22	369.40	736.51	3.74				
Pacific sand lance										
Pacific sanddab										
Petrale sole					2.13		0.40			0.85
Quillback rockfish										
Redbanded rockfish	6.99	52.10	27.81	37.42	30.34					2.96
Redstripe rockfish	2.96				11.90	19.23	1.75	1.31		0.61
Rex sole		9.12	2.51	2.70	4.94	0.42		0.96	24.01	40.39
Rosethorn rockfish			0.39		3.18	0.46				
Rougheye rockfish	1.78	26.11	8.10	1.52						
Sablefish	1.36	57.34	15.07	1.36	14.16	3.54			1.31	0.51
Sandpaper skate					0.12					
Sharpchin rockfish	0.76				12.21	0.62				
Shortraker rockfish										
Shortspine thornyhead	0.64	7.80	35.83	4.74	13.37					
Silvergray rockfish	1.55			2.61	18.92	3.80	33.47	2.83		0.90
Slender sole		0.36							2.42	
Southern rock sole										
Spiny dogfish	2.89	2.54	2.44	13.90	17.08	5.60			4.80	1.65
Splitnose rockfish	0.04	0.40	0.32							
Spotted ratfish	0.30				1.11	0.74	3.63	0.16	0.85	0.53
Walleye pollock					6.52				9.39	
Widow rockfish										
Wolf eel										
Yelloweye rockfish								1.90		
Yellowmouth rockfish		13.92	5.24	5.50	386.19	2.31		0.28		
Yellowtail rockfish					8.99	1.76			2.20	
Other	1.34	2.74	2.62	3.56	5.91	0.52	4.12	1.56	0.64	0.03
Total	199.97	781.73	453.00	589.33	1501.89	49.94	96.34	14.61	159.69	189.89

Appendix B continued.

Species	131	132	133	134	135	136	137	138	139	140
Aleutian skate										
Arrowtooth flounder	1.72	21.68	19.90	40.06	30.12	21.46		28.64		134.89
Big skate										
Bigmouth sculpin										
Black eelpout										
Blackbelly eelpout				0.26						0.10
Blackfin sculpin										
Bocaccio	43.64	4.42		4.54						
Canary rockfish	12.66								1.69	
Curfin sole										
Darkblotched rockfish		4.06	2.60	4.42	2.80					
Dover sole		13.34	10.14	10.44	9.30	8.35				3.36
Dusky rockfish										
English sole					0.72	1.86		2.86		1.53
Eulachon										
Flathead sole		0.96		10.22	2.08			2.16		24.69
Greenstriped rockfish								0.44		
Lingcod	121.80					2.88			131.05	7.16
Longnose skate	7.98									2.92
Longspine thornyhead										
Pacific cod					2.98	0.34		14.14		
Pacific hake		38.56	131.24	3.04	4.08	1.36				
Pacific halibut	61.76				10.90				53.73	
Pacific ocean perch		419.81	223.71	241.20	205.20	212.04	3.80	18.16	9.67	2.33
Pacific sand lance										
Pacific sanddab										
Petrale sole	2.70									0.55
Quillback rockfish										
Redbanded rockfish			9.38	5.86	19.52	6.86		16.67		
Redstripe rockfish				0.54						
Rex sole		28.66	6.90	11.94	30.76	12.74	0.30	13.76		39.60
Rosethorn rockfish										
Rougheye rockfish		2.70	11.10	1.18		6.46				
Sablefish			38.78	5.96	6.48	23.74		4.32		
Sandpaper skate			0.90							
Sharpchin rockfish										
Shortraker rockfish										
Shortspine thornyhead		18.18	7.72	6.98	39.15	12.89	1.32		0.35	
Silvergray rockfish	606.24	4.22			2.04				3.00	59.49
Slender sole		1.02	0.36	3.52	0.84	0.24		0.52		1.17
Southern rock sole	4.18									
Spiny dogfish			1.80	1.10	1.76	2.37		9.73	3.17	4.64
Splitnose rockfish		85.13	12.52	12.74	1.20					
Spotted ratfish	0.78			0.78	0.24	2.42			6.96	3.76
Walleye pollock										
Widow rockfish										
Wolf eel										
Yelloweye rockfish										
Yellowmouth rockfish		3.70	2.72	53.38	29.08	4.52		14.14		
Yellowtail rockfish	1.14						2.09	1.98		
Other		0.37	3.08	0.52	1.68	0.35		0.14	0.46	
Total	864.60	646.81	482.85	418.68	400.93	320.88	7.51	127.66	210.08	286.19

Appendix B continued.

Species	141	142	143	144	145	146	147	148	149	150
Aleutian skate										
Arrowtooth flounder	261.01	377.57	214.12			1.58	25.50	90.47	163.06	
Big skate						12.98				
Bigmouth sculpin										
Black eelpout										
Blackbelly eelpout	0.10									
Blackfin sculpin										
Bocaccio										
Canary rockfish				0.88		0.36	1.78			
Curfin sole					0.32		0.36		0.58	0.42
Darkblotched rockfish										
Dover sole	2.62	5.10	0.58							
Dusky rockfish										
English sole	21.68	21.83	13.65				4.82	13.29	11.04	
Eulachon										
Flathead sole	10.88	5.05	1.92							
Greenstriped rockfish		4.86								
Lingcod			6.95		4.32					
Longnose skate	4.78									
Longspine thornyhead										
Pacific cod	2.04	1.38	2.12	3.23		21.60	68.56			6.06
Pacific hake										
Pacific halibut		9.75						8.84	10.84	
Pacific ocean perch										
Pacific sand lance				1.28	0.08	4.30			1.18	0.09
Pacific sanddab					6.51	1.78	41.94	17.29	47.66	
Petrale sole	0.48	3.08	2.98				2.04	2.52	6.74	
Quillback rockfish				9.43						
Redbanded rockfish										
Redstripe rockfish		0.24		30.00						1.40
Rex sole	41.78	33.46	4.56					0.32		
Rosethorn rockfish										
Rougheye rockfish										
Sablefish	15.64	2.20	0.44							
Sandpaper skate										
Sharpchin rockfish	0.30									
Shortraker rockfish										
Shortspine thornyhead										
Silvergray rockfish	29.90	4.82								
Slender sole	0.34	0.19								
Southern rock sole				5.87	13.96	4.20	45.68	1.98	15.66	5.46
Spiny dogfish			3.65			6.92	1.40		6.58	
Splitnose rockfish										
Spotted ratfish	4.10	6.36	5.44	40.64	6.90	84.28	9.68	4.21	3.66	78.02
Walleye pollock						0.62				
Widow rockfish										
Wolf eel						6.89				4.88
Yelloweye rockfish										
Yellowmouth rockfish										
Yellowtail rockfish	1.26									
Other		0.51		3.06	0.39	0.86		0.05		0.19
Total	396.91	476.40	256.41	94.39	32.48	146.37	201.76	138.97	267.00	96.52

Appendix B continued.

Species	151	152	153	154	155	156	157	158	159	160
Aleutian skate										
Arrowtooth flounder			2.13	0.12		0.30	3.77	3.88	6.32	1.69
Big skate										
Bigmouth sculpin										
Black eelpout										
Blackbelly eelpout										
Blackfin sculpin										
Bocaccio										
Canary rockfish				10.49	464.70	23.44	3.21			307.67
Curfin sole	0.65									
Darkblotched rockfish										
Dover sole										
Dusky rockfish										
English sole										
Eulachon								1.08		
Flathead sole										
Greenstriped rockfish				0.43	1.38		0.19			0.59
Lingcod		8.30	20.91	17.02	12.58					
Longnose skate										
Longspine thornyhead										
Pacific cod							4.90	2.19		1.68
Pacific hake								2.53		
Pacific halibut	5.57	23.82	66.80							7.95
Pacific ocean perch								4.22	10.26	
Pacific sand lance		0.40								
Pacific sanddab	2.42	2.98		0.18						
Petrale sole							0.97			
Quillback rockfish										
Redbanded rockfish								2.00	7.97	
Redstripe rockfish										
Rex sole		0.40					0.30	0.46	1.25	0.31
Rosethorn rockfish										
Rougheye rockfish									0.79	
Sablefish								0.68	1.78	
Sandpaper skate										
Sharpchin rockfish				0.14						
Shortraker rockfish										
Shortspine thornyhead								10.24	2.63	
Silvergray rockfish				17.41	3.39	33.44	13.74	6.63		16.99
Slender sole								0.27		
Southern rock sole	35.88	102.28	5.53	0.60						
Spiny dogfish			10.88	5.67	3.12			12.53	27.10	29.08
Splitnose rockfish								1.40	144.85	5.15
Spotted ratfish	6.68	20.88	13.23	0.40	1.88	0.57	0.53			3.73
Walleye pollock							0.82		1.57	0.80
Widow rockfish										
Wolf eel										
Yelloweye rockfish				24.25	7.41					
Yellowmouth rockfish				0.14	6.33					
Yellowtail rockfish									38.60	
Other	0.61	0.08		0.25	0.56	1.41	4.20	1.20	0.12	
Total	51.81	159.14	119.48	77.10	501.35	59.16	32.63	49.31	243.24	375.64

Appendix B continued.

Species	161	162	163	164	165	166	167	168	169	170
Aleutian skate										
Arrowtooth flounder	4.05	4.30		0.73	0.60	42.94	0.62	14.20	39.93	3.66
Big skate										
Bigmouth sculpin										
Black eelpout										
Blackbelly eelpout				0.28	0.10					
Blackfin sculpin										
Bocaccio										
Canary rockfish	343.79									5.64
Curlfin sole						0.78				
Darkblotched rockfish										
Dover sole					0.30	1.82			0.82	
Dusky rockfish										
English sole				10.56	8.04	12.88	0.26	14.34	28.08	0.50
Eulachon										
Flathead sole									0.63	
Greenstriped rockfish	6.62	2.90								
Lingcod		5.76			2.80		8.74			4.80
Longnose skate								4.62		
Longspine thornyhead										
Pacific cod	4.00					23.22	3.05			
Pacific hake										
Pacific halibut	7.30							4.12	7.81	
Pacific ocean perch		0.08								
Pacific sand lance										
Pacific sanddab						0.52	0.50	2.18	0.15	
Petrale sole				1.58	1.09	12.14	0.37	6.46	2.14	0.16
Quillback rockfish							1.14			
Redbanded rockfish		0.05								
Redstripe rockfish		2.92								
Rex sole	0.17	5.07		5.18	10.45	8.06	0.47	2.83	15.34	
Rosethorn rockfish		3.34								
Rougheye rockfish										
Sablefish				0.39		6.24				
Sandpaper skate										
Sharpchin rockfish		34.71								
Shortraker rockfish										
Shortspine thornyhead		0.58								
Silvergray rockfish	18.53	1.15		21.48	10.59	46.24	34.46	67.20	76.34	32.48
Slender sole		0.10			0.30				0.19	
Southern rock sole						0.90	2.76	0.48		0.82
Spiny dogfish	2.14	1.60			2.62	2.92	7.96	2.18	4.85	
Splitnose rockfish										
Spotted ratfish	1.12	0.86		0.99	0.57	1.20	1.49	12.00	0.91	0.76
Walleye pollock	0.61					2.06				0.08
Widow rockfish										
Wolf eel										
Yelloweye rockfish										
Yellowmouth rockfish	0.10	3.94					0.02			
Yellowtail rockfish									2.68	
Other	1.78	1.59		0.47	2.00	8.32	2.44	3.94	4.49	5.46
Total	390.21	68.95		41.66	39.46	170.24	64.28	134.55	184.36	54.36

Appendix B continued.

Species	171	172	173	174	175	176	177	178	179	180
Aleutian skate										
Arrowtooth flounder		0.42		66.84	56.14	18.88	98.14	38.92	15.81	23.99
Big skate										
Bigmouth sculpin										
Black eelpout										
Blackbelly eelpout				0.34		0.18			0.15	
Blackfin sculpin										0.22
Bocaccio									4.19	
Canary rockfish	1.42	14.11				0.59	3.37	2.35		
Curlfin sole										
Darkblotched rockfish										
Dover sole		1.18		20.96	5.88	11.67	31.83	0.78	63.22	0.41
Dusky rockfish										
English sole					17.44	6.89	17.65	18.06	11.32	
Eulachon										
Flathead sole				20.11						
Greenstriped rockfish		2.17								0.48
Lingcod					3.28	0.44	5.15	2.71		
Longnose skate				4.95						
Longspine thornyhead										
Pacific cod	0.48	5.36		1.60	3.78	1.85	14.38	1.32		5.66
Pacific hake								29.92	1.88	
Pacific halibut					11.08		3.36	3.42	7.77	6.12
Pacific ocean perch				5.84				1.74	0.44	30.61
Pacific sand lance										
Pacific sanddab										
Petrale sole		5.98		7.10	17.23	22.42	51.78	11.10		4.62
Quillback rockfish	2.96					0.84				
Redbanded rockfish				3.40					11.70	1.04
Redstripe rockfish	1.48	895.73					0.11		0.08	
Rex sole		5.79		27.05	61.79	22.51	54.02	37.10	45.37	0.34
Rosethorn rockfish										
Rougheye rockfish										
Sablefish		0.48		0.72	5.52	5.49	1.56	0.58	1.47	1.07
Sandpaper skate										
Sharpchin rockfish	0.08								0.38	
Shortraker rockfish										
Shortspine thornyhead									1.56	
Silvergray rockfish	1.04	13.54		36.43	4.12		2.82	21.44	17.21	39.76
Slender sole				1.70	1.18		0.28	0.82	1.25	
Southern rock sole	0.12				0.42					
Spiny dogfish		1.28		6.57		3.43	2.42	12.06		12.17
Splitnose rockfish										
Spotted ratfish	0.75	1.99		0.41	1.58	1.22	5.89	0.88	0.96	5.89
Walleye pollock		1.56		1.74	5.42	0.86	0.61	5.04	2.86	3.09
Widow rockfish	0.41									2.36
Wolf eel										
Yelloweye rockfish										
Yellowmouth rockfish	0.10									
Yellowtail rockfish	5.81					0.52		1.24	3.87	2.45
Other	8.74	0.34		1.54	19.02	5.05	6.34	12.98	5.72	0.24
Total	23.39	949.93		207.30	213.88	102.84	299.71	202.46	197.21	140.48

Appendix B continued.

Species	181	182	183	184	185	186	187	188	189	190
Aleutian skate										
Arrowtooth flounder	7.75	29.10	9.94	5.78	11.46	10.09	11.06	16.03	23.74	40.46
Big skate										
Bigmouth sculpin										8.94
Black eelpout			0.54		0.32					
Blackbelly eelpout		0.34								
Blackfin sculpin		0.16								
Bocaccio	13.98									
Canary rockfish	1.05	1.23						125.21		3.95
Curlfin sole										
Darkblotched rockfish										
Dover sole	0.54	29.30	1.20	1.28	23.18	0.86	1.74		22.76	26.55
Dusky rockfish		57.22								
English sole		1.64						1.07		
Eulachon										
Flathead sole										
Greenstriped rockfish	2.98	0.96				1.92	6.40	2.22		
Lingcod		3.52					7.01	5.91		
Longnose skate			4.17	1.43	9.06					7.12
Longspine thornyhead										
Pacific cod	1.53	0.70	1.66			1.84	5.20	4.08		
Pacific hake	1.07		204.72	115.69	55.28				7.37	76.52
Pacific halibut						6.68				
Pacific ocean perch	462.66	275.59	33.84	11.49	21.92	41.94	40.40	0.39	3.17	123.52
Pacific sand lance										
Pacific sanddab										
Petrable sole	0.46					4.09		4.22		
Quillback rockfish										
Redbanded rockfish	2.53	7.28	2.56	4.24			8.68	0.92		20.21
Redstripe rockfish	368.89	73.71					1.44			
Rex sole	1.53	22.67			1.32	14.77	9.92	2.16	36.56	21.79
Rosethorn rockfish										0.64
Rougheye rockfish			19.52	7.86	15.28				2.80	7.82
Sablefish		1.68	52.52	96.89	95.66	0.50			2.20	13.20
Sandpaper skate			1.70							
Sharpchin rockfish	5.06	166.75				0.03	9.82	0.13		0.60
Shortraker rockfish										
Shortspine thornyhead		1.88	15.42	10.64	10.20		2.60		6.53	24.34
Silvergray rockfish	1323.39	227.63				2.66	13.40	12.79		1.58
Slender sole		1.10				0.40	0.30	0.05	0.32	
Southern rock sole								1.36		
Spiny dogfish			5.96			1.88		17.16		
Splitnose rockfish							0.26		0.20	1.50
Spotted ratfish	1.05	0.78		3.76	3.42	1.15	0.80	3.91	0.44	0.76
Walleye pollock	2.55	5.38				1.88	13.58			
Widow rockfish	9.26									
Wolf eel										
Yelloweye rockfish										
Yellowmouth rockfish	10.38	10.74					0.54			
Yellowtail rockfish	11.07	4.36				1.72	26.14	1.46		
Other	0.69	20.51	10.29	1.63	19.40	0.90	1.26	0.16	0.63	5.23
Total	2228.42	944.23	364.04	260.69	266.50	93.31	160.55	199.23	106.72	384.73

Appendix B continued.

Species	191	192	193	194	195	196	197	198	199	200
Aleutian skate										
Arrowtooth flounder	3.30	7.74		9.42	17.22	11.91	5.20	12.24	10.76	4.05
Big skate										
Bigmouth sculpin										
Black eelpout		0.94								0.47
Blackbelly eelpout										
Blackfin sculpin	0.38									
Bocaccio										
Canary rockfish									4.50	
Curlfin sole										
Darkblotched rockfish										
Dover sole	5.14	70.94		8.38	1.40	3.03	1.62	2.11	0.54	3.93
Dusky rockfish										
English sole	0.78									
Eulachon				0.22	0.24		0.46			
Flathead sole										
Greenstriped rockfish	2.94								79.54	
Lingcod				6.10					4.42	
Longnose skate		6.17			11.11			12.13		10.00
Longspine thornyhead										
Pacific cod	0.46								15.08	
Pacific hake	7.32	163.71		22.93	6.64	1.37	17.18			33.55
Pacific halibut										
Pacific ocean perch	356.82	32.94		10.58	43.30	55.86	77.72	105.00	2.42	53.33
Pacific sand lance										
Pacific sanddab										
Petrals sole	1.92				0.80	1.29		3.34	7.54	
Quillback rockfish										
Redbanded rockfish	20.36	4.20		0.68	1.06	1.65	3.96			2.61
Redstripe rockfish	3.60								3.76	
Rex sole	8.28	0.42		4.06	3.32	8.76	3.82	6.43	1.82	0.53
Rosethorn rockfish	0.96									
Rougheye rockfish		1.70					0.50			
Sablefish	0.80	30.98		1.84	1.74	1.11	1.64	6.06	3.48	15.96
Sandpaper skate		0.48								
Sharpchin rockfish	63.36									
Shortraker rockfish										
Shortspine thornyhead	5.20	11.00		17.38	11.08	3.18	13.08	6.47		12.45
Silvergray rockfish	59.51	12.92			3.74	5.74	8.62	17.19	82.22	11.24
Slender sole					1.38	0.50	0.42	0.79		
Southern rock sole										
Spiny dogfish	7.62	5.96					6.56	7.56	1.28	
Splitnose rockfish				1.16		11.16	4.02	0.69		14.50
Spotted ratfish					0.80	1.28		2.45	19.04	2.36
Walleye pollock	2.94				17.02	8.86	59.36	2.70	3.52	
Widow rockfish										
Wolf eel										
Yelloweye rockfish	3.67									
Yellowmouth rockfish	5.06					0.21			143.65	1.58
Yellowtail rockfish						1.73				
Other	1.48	2.36		2.44	2.55	1.57	3.80	3.83	4.58	4.90
Total	561.90	352.46		85.19	123.40	119.21	207.96	188.99	388.15	171.46

Appendix B continued.

Species	201	202	203	204	205	206	207	208	209	210
Aleutian skate										
Arrowtooth flounder	19.12	0.74	7.84	45.68	24.72	40.66	2.38	4.21	5.98	23.12
Big skate										
Bigmouth sculpin										
Black eelpout					0.62	0.56	0.79	0.26	0.20	
Blackbelly eelpout										0.02
Blackfin sculpin										
Bocaccio										
Canary rockfish	1.32									2.44
Curlfin sole										
Darkblotched rockfish			2.04					2.05	0.72	
Dover sole		1.92	1.06	4.74	1.68	4.12	1.89	1.39	39.70	7.50
Dusky rockfish										
English sole	10.44									
Eulachon										
Flathead sole										0.56
Greenstriped rockfish	3.64									2.28
Lingcod	1.40									4.80
Longnose skate			0.93	1.42	5.56	11.50	5.53	5.68		
Longspine thornyhead										
Pacific cod										
Pacific hake		67.91	17.78	61.48	90.46	250.98	69.44	20.55	119.62	20.36
Pacific halibut								4.17		
Pacific ocean perch	30.22	1391.44	93.22	89.57	153.49	122.02	156.85	116.75	159.72	
Pacific sand lance										
Pacific sanddab										
Petrable sole	3.82									
Quillback rockfish										
Redbanded rockfish		13.26	13.26				17.45	7.53		
Redstripe rockfish								0.88		247.08
Rex sole	3.28	1.88	0.66							4.76
Rosethorn rockfish		2.66								
Rougheye rockfish		4.68				2.88	16.37	5.34	5.72	
Sablefish	1.16	5.72	2.50	8.42	9.14	12.34	3.99	4.04	5.40	4.86
Sandpaper skate			0.79			1.23	0.99		1.17	
Sharpchin rockfish		0.60		0.46						
Shortraker rockfish										
Shortspine thornyhead	2.04	15.70	8.90	12.06	10.40	12.30	18.13	19.91	15.36	
Silvergray rockfish	16.76	1.70								24.78
Slender sole	0.66							0.63		2.16
Southern rock sole										
Spiny dogfish	5.34	6.02					1.05			
Splitnose rockfish	2.44	7.88	0.44				1.09	2.10	0.32	
Spotted ratfish	0.74	3.24		1.64	0.64	2.50	0.47	1.30		0.26
Walleye pollock	0.30	3.30	0.84					0.31		2.04
Widow rockfish	6.16									47.24
Wolf eel										
Yelloweye rockfish										
Yellowmouth rockfish	1247.36	11.86	1.80					3.28	1.40	43.42
Yellowtail rockfish	1.82									390.92
Other	4.82	7.84	4.08	5.06	4.96	5.38	6.16	5.91	0.86	
Total	1362.84	1548.35	156.14	230.53	301.67	466.47	302.58	206.29	356.17	828.60

Appendix B continued.

Species	211	212	213	214	215	216	217	218	219	220
Aleutian skate										
Arrowtooth flounder	61.10	79.40	62.50	32.58	7.91	44.99	6.62	27.20	7.70	18.12
Big skate										
Bigmouth sculpin										
Black eelpout							0.26	0.41	0.26	0.20
Blackbelly eelpout	0.06		0.52	0.96						
Blackfin sculpin										
Bocaccio										
Canary rockfish		2.30	1.46							
Curlfin sole					0.78					
Darkblotched rockfish				2.11						
Dover sole	6.52	8.22	11.32	15.42	0.38	3.53	9.26	13.84	22.16	25.98
Dusky rockfish										
English sole					189.26	18.52				
Eulachon										
Flathead sole	0.76		2.14	1.23						
Greenstriped rockfish	4.36	5.30	20.32	11.64		22.69				
Lingcod			10.76							
Longnose skate		7.42	4.02				2.87			3.37
Longspine thornyhead										
Pacific cod	9.02	0.84	2.76	2.72	79.92	2.13				
Pacific hake	4.92	1.68					104.55	61.49	92.50	73.23
Pacific halibut					6.88					
Pacific ocean perch	20.32	2.48					64.81	103.49	91.21	62.92
Pacific sand lance										
Pacific sanddab					11.40					
Petrale sole	6.34	4.96	0.64	1.19	6.94	9.60				
Quillback rockfish										
Redbanded rockfish	0.82			4.94					1.88	
Redstripe rockfish	328.81	168.16	1.04	69.05						
Rex sole	22.96	7.86	17.02	58.40	5.47	17.60			0.16	0.70
Rosethorn rockfish										
Rougheye rockfish								4.42	21.60	27.94
Sablefish	13.76	10.14	7.74	4.16		1.06	44.77	30.82	17.56	28.70
Sandpaper skate	0.18									0.74
Sharpchin rockfish		0.06		2.24						
Shortraker rockfish										
Shortspine thornyhead							11.67	10.48	28.14	13.80
Silvergray rockfish	52.91	14.63	34.60	82.21						
Slender sole	2.36	1.58	2.74	1.88		0.02				
Southern rock sole					9.90					
Spiny dogfish		3.42	1.24	1.12		4.49				
Splitnose rockfish							0.34			
Spotted ratfish	0.40	0.48	0.20		0.52	2.77	0.82		2.64	0.50
Walleye pollock										
Widow rockfish	9.52									
Wolf eel										
Yelloweye rockfish										
Yellowmouth rockfish	33.38	6.10		46.36						
Yellowtail rockfish	194.70	19.32	129.42	78.88		2.85				
Other	0.08	0.22	0.67	1.06	0.59	0.84	1.80	0.88	2.00	1.29
Total	773.28	344.57	311.11	418.15	319.95	131.09	247.77	253.03	287.81	257.49

Appendix B continued.

Species	221	222	223	224	225	226	227	228	229	230
Aleutian skate										
Arrowtooth flounder	10.66	304.47	115.38	7.19	30.47	23.32	9.82	1.34	21.42	149.99
Big skate										
Bigmouth sculpin										
Black eelpout	0.64				0.10			0.31		
Blackbelly eelpout										
Blackfin sculpin		2.29	0.74	0.88			0.13		0.65	1.62
Bocaccio										
Canary rockfish						6.50				
Curfin sole										
Darkblotched rockfish	5.98	3.34			1.32					38.59
Dover sole	5.56	3.36	1.90		34.42	0.51	0.65	11.82	31.38	8.86
Dusky rockfish										
English sole						1.07				
Eulachon										
Flathead sole										
Greenstriped rockfish						12.16				
Lingcod						2.08				3.27
Longnose skate								2.53		
Longspine thornyhead		6.41	14.71							
Pacific cod						12.53				
Pacific hake	35.14	9.28	29.17	6.68	63.49	5.63	33.94	1.83	133.17	5.80
Pacific halibut					13.86		24.92	1.33	6.78	
Pacific ocean perch	70.06	11.94	15.80	39.94	20.52		72.23	39.26	365.58	1871.46
Pacific sand lance										
Pacific sanddab										
Petrable sole						0.61				
Quillback rockfish										
Redbanded rockfish	36.80	20.58	1.12	7.65	4.79	2.30	14.47	1.04	16.54	18.82
Redstripe rockfish						220.60				
Rex sole	0.68				10.91	3.99	3.67	22.92	0.84	0.56
Rosethorn rockfish						5.87				1.20
Rougheye rockfish	58.35	23.03	9.75	25.36	2.90			0.93	12.10	11.50
Sablefish	5.18	9.91	14.96		11.26		1.47	4.56	37.98	17.15
Sandpaper skate	2.05	1.12			0.84				3.82	1.26
Sharpchin rockfish						8.47				
Shortraker rockfish			23.92	9.72	19.48					
Shortspine thornyhead	16.40	61.66	32.63	20.84	21.99		5.84	16.72	78.65	74.22
Silvergray rockfish						19.35	44.59	11.75		
Slender sole					0.24					
Southern rock sole										
Spiny dogfish	1.78								6.12	9.65
Splitnose rockfish	0.56							0.78		0.70
Spotted ratfish	1.48				0.53	1.77	1.42	0.35		5.17
Walleye pollock							11.72	2.98		
Widow rockfish										
Wolf eel										
Yelloweye rockfish						13.18				
Yellowmouth rockfish						3.60				
Yellowtail rockfish										
Other	1.74	7.57	8.92	5.09	3.23	5.56	7.83	0.94	6.10	3.89
Total	253.06	464.96	269.00	123.35	240.35	349.10	232.70	121.39	721.13	2223.71

Appendix B continued.

Species	231	232	233	234	235	236	237	238	239	240
Aleutian skate										
Arrowtooth flounder	81.16		9.74	38.80	9.42	30.12	26.50	4.89	4.93	2.86
Big skate										
Bigmouth sculpin										
Black eelpout							0.16			
Blackbelly eelpout										
Blackfin sculpin										
Bocaccio										
Canary rockfish								2.02	3.23	2.06
Curlfin sole										
Darkblotched rockfish	9.22					124.24	3.08			
Dover sole	0.26		1.30	7.43	0.39	3.59	0.72	0.93		2.70
Dusky rockfish										
English sole									0.43	0.58
Eulachon										
Flathead sole										
Greenstriped rockfish					0.29			4.67	0.53	1.60
Lingcod	3.17			7.02				3.65		1.52
Longnose skate							10.74		10.54	
Longspine thornyhead										
Pacific cod	4.53				5.58			0.87	1.79	1.40
Pacific hake				1.56		9.12	17.26	0.73		
Pacific halibut				1.96	40.50				7.01	13.51
Pacific ocean perch	260.72		632.20	148.93	169.28	234.81	129.40			
Pacific sand lance										
Pacific sanddab										
Petrable sole								0.23		0.40
Quillback rockfish										
Redbanded rockfish	1.88		8.26		5.60	5.50	16.18			
Redstripe rockfish					237.99			0.72	45.68	377.71
Rex sole			2.26	2.56	1.38	0.63	0.46	18.00	13.43	16.94
Rosethorn rockfish	2.73		0.54	1.36	0.28	8.50	1.28			
Rougheye rockfish	1.67					28.64	10.12			
Sablefish			0.60	2.06	0.64	5.52	6.08			
Sandpaper skate										
Sharpchin rockfish			1.22		9.30	0.99				
Shortraker rockfish						20.06	3.26			
Shortspine thornyhead	13.79		9.46	13.92	10.08	28.88	38.32			
Silvergray rockfish			19.54		3.32	3.14	4.46	10.92	13.65	1.84
Slender sole				0.02	0.22	0.25	0.40	0.25	0.14	0.42
Southern rock sole										
Spiny dogfish				5.38					13.87	3.12
Splitnose rockfish				125.36		29.32	1378.95			
Spotted ratfish					5.64		0.58	0.18		0.22
Walleye pollock			1.86	0.32	2.13		5.39	0.55	0.11	0.54
Widow rockfish					3.30		1.84			
Wolf eel										
Yelloweye rockfish									2.23	
Yellowmouth rockfish	0.26		8.32	48.24	3.86	4.24	74.18			
Yellowtail rockfish					1.86					1.66
Other	2.94		0.86	1.31	0.58	2.41	2.82	2.65		5.01
Total	382.33		696.16	406.23	511.64	539.96	1732.18	51.26	117.57	434.09

Appendix B continued.

Species	241	242	243	244	245	246	247	248	249	250
Aleutian skate										
Arrowtooth flounder	2.84	13.72	0.84	2.36		37.98	24.62	24.32	28.78	16.68
Big skate										
Bigmouth sculpin										
Black eelpout			0.24							
Blackbelly eelpout										
Blackfin sculpin										
Bocaccio	7.52									2.94
Canary rockfish						53.99	4.62			
Curlfin sole										
Darkblotched rockfish		26.92		25.44					0.96	
Dover sole	8.36	0.88	38.72	0.76	3.97	0.34	10.84	28.56		
Dusky rockfish										
English sole										
Eulachon										
Flathead sole										
Greenstriped rockfish	1.64									
Lingcod						5.74				3.22
Longnose skate										
Longspine thornyhead										
Pacific cod						5.56				
Pacific hake		42.60	96.04	2.14	4.87		26.58	272.17	103.12	
Pacific halibut						7.96			6.90	16.99
Pacific ocean perch	200.15	467.99		386.63			328.65	146.54	331.42	427.64
Pacific sand lance										
Pacific sanddab										
Petrale sole										
Quillback rockfish										
Redbanded rockfish	1.63	7.80		0.90			0.64		3.16	7.58
Redstripe rockfish	24.86					1.82				
Rex sole	4.23	0.30	4.28		3.18	2.28	1.16	6.26	3.12	0.72
Rosethorn rockfish	1.94	0.90		10.78				0.42	0.32	9.00
Rougeye rockfish		3.96	152.83	1.80						
Sablefish	35.44	5.44	24.76				8.88	15.68		2.82
Sandpaper skate							0.52			
Sharpchin rockfish	85.71			1.80		0.18		0.42		125.30
Shortraker rockfish			41.52		4.54					
Shortspine thornyhead	6.48	8.40	34.36	3.60	21.00		21.74	7.44	16.78	9.66
Silvergray rockfish	4.56			3.92		90.98	6.38			2.02
Slender sole	1.43					0.20			0.10	
Southern rock sole										
Spiny dogfish	2.44					5.26	1.08		4.32	1.96
Splitnose rockfish	0.68	65.66		55.86				47.34	5.50	0.66
Spotted ratfish			2.12	0.34		0.88				
Walleye pollock	9.58									
Widow rockfish	3.54			2.46						1.38
Wolf eel										
Yelloweye rockfish										
Yellowmouth rockfish	243.79	27.53		282.60		3.32		2.00	9.68	102.52
Yellowtail rockfish						5.06				
Other	0.60	2.22	5.04		3.18		1.52		3.08	6.92
Total	647.42	674.32	400.75	781.39	40.74	221.55	437.23	551.15	517.24	738.01





